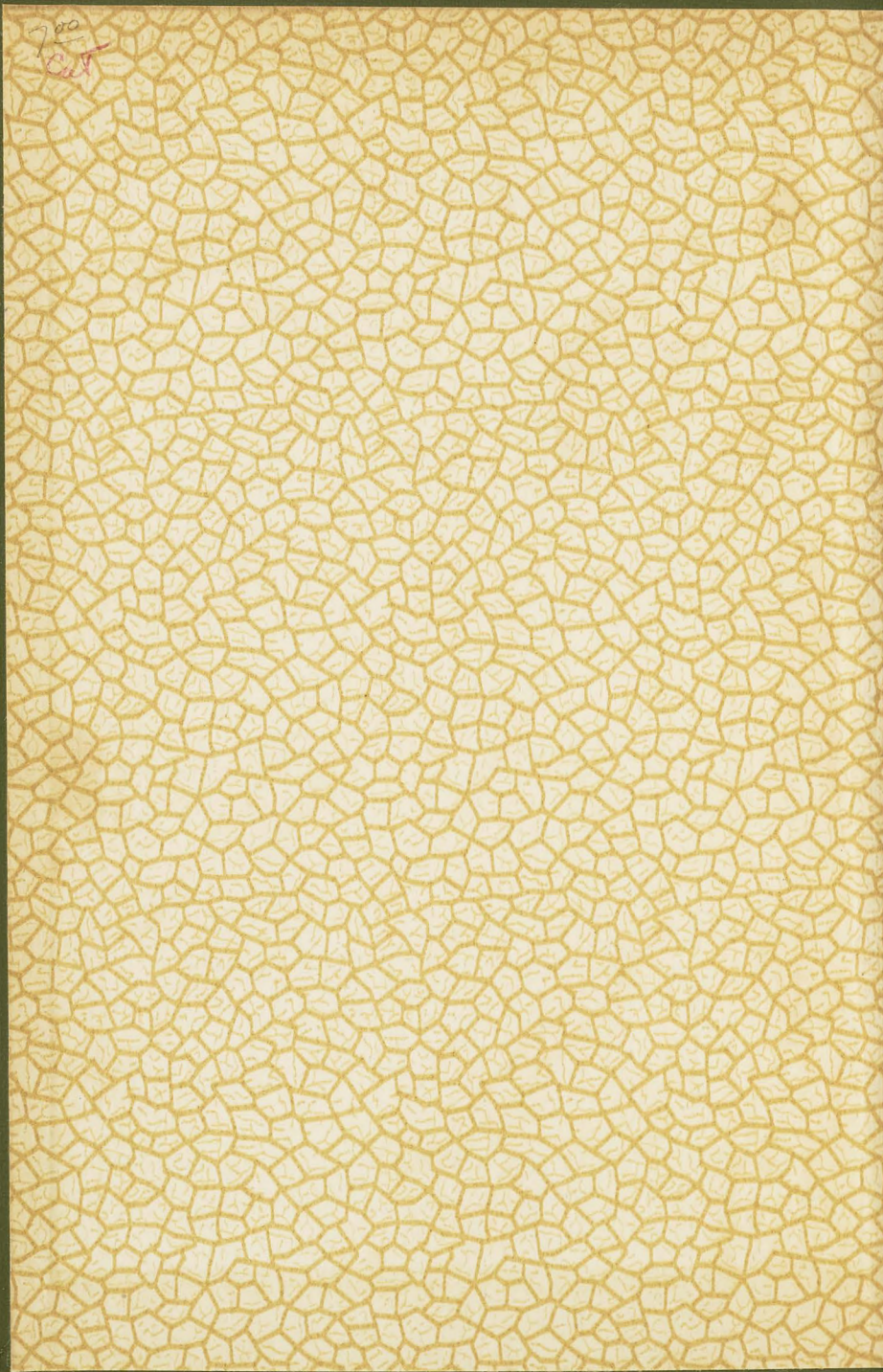
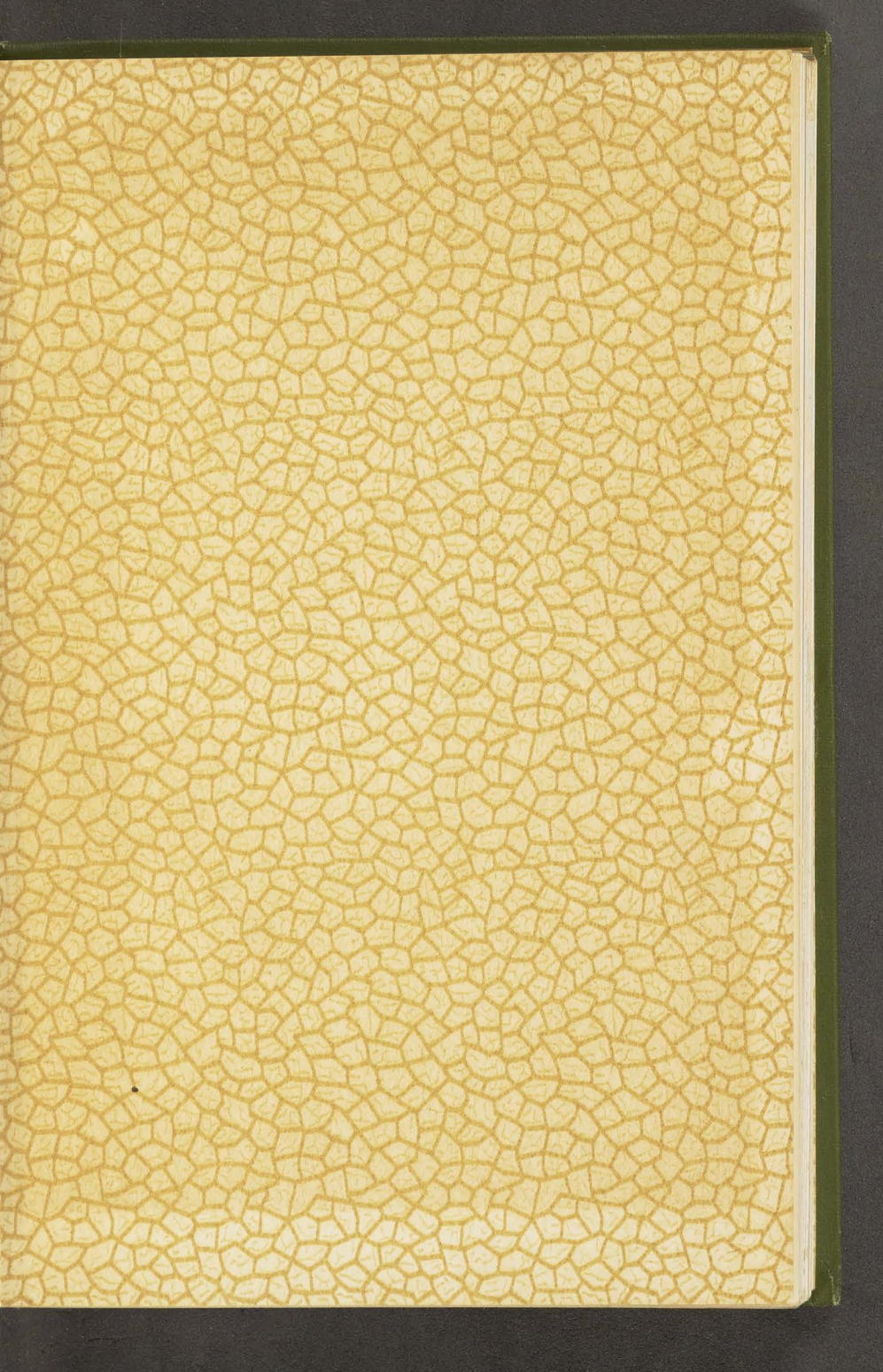


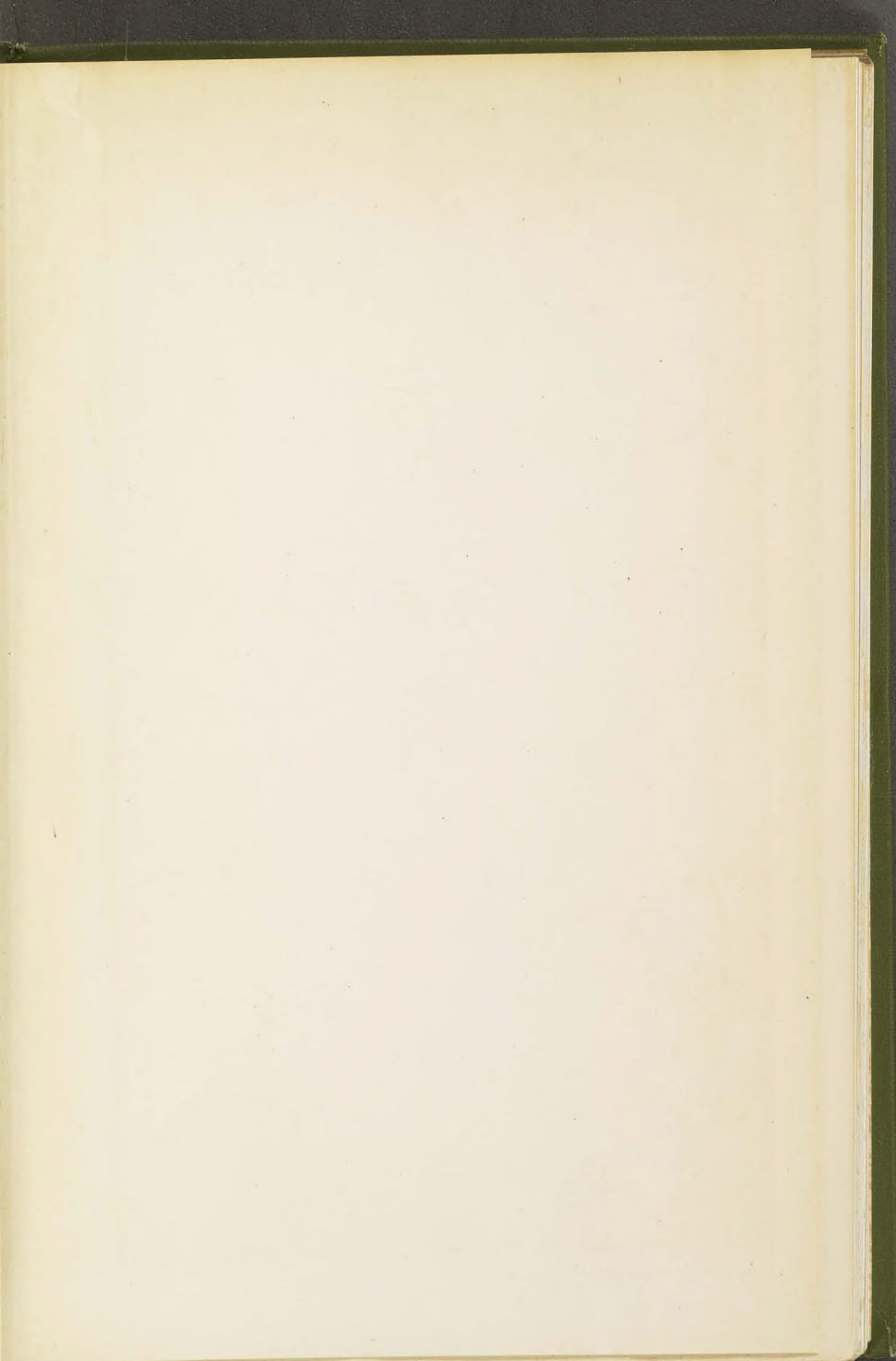
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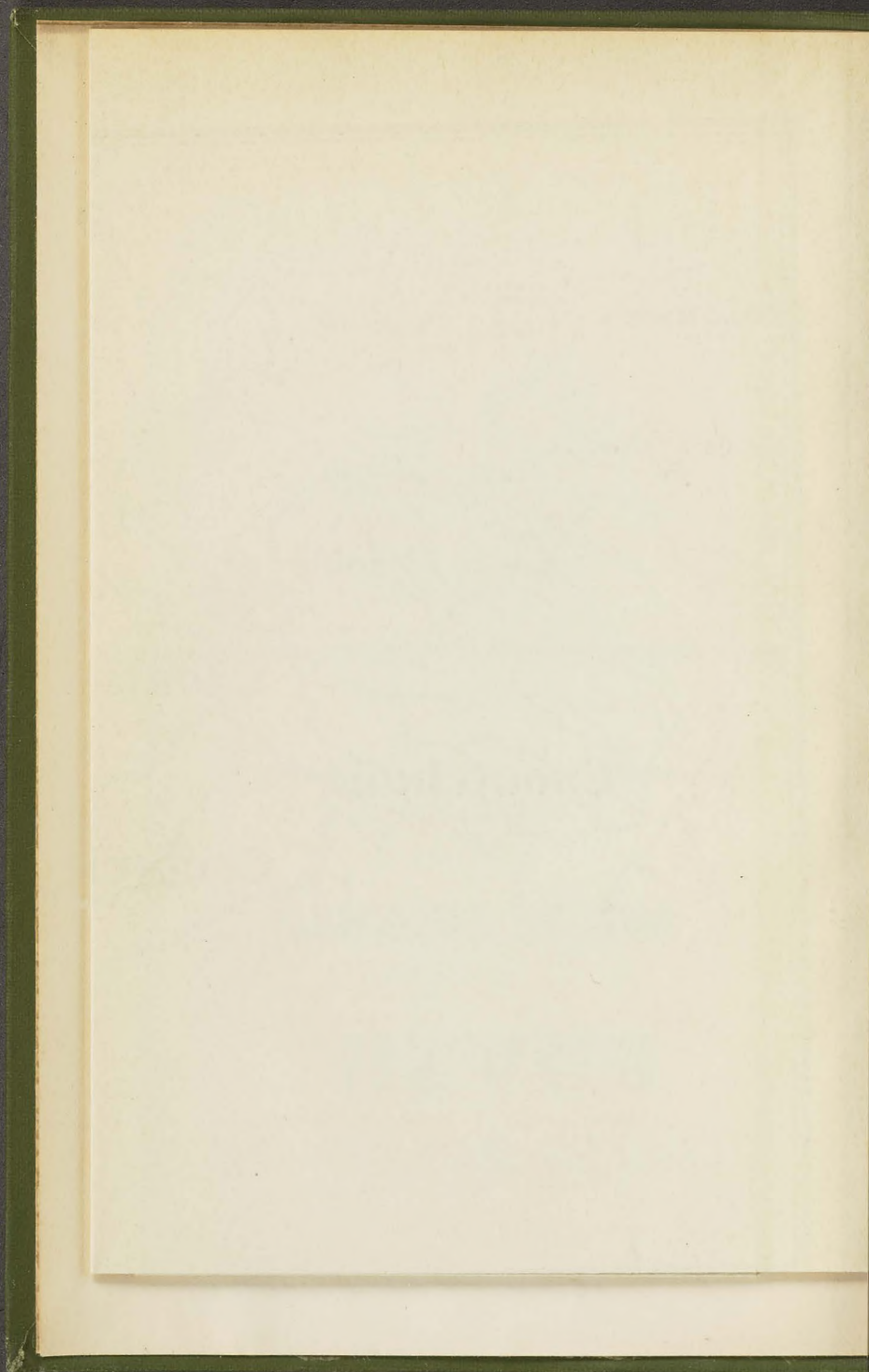


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BRAZIL

IN 1910

BY

J. C. OAKENFULL

EDITED BY THE
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March, 1910

BRAZIL

IN 1910

A. C. GREENHILL

RECTOR OF THE

UNIVERSITY OF THE STATE OF BRAZIL

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DEDICATION.

Terra do Promissão.

TRULY thou art well called Land of Promise.

Fain would I wander in thy pleasant groves,
and beside thy peaceful streams. Alas! I am pent
within this isle where the misty clouds wreathe
the tops of the hills, and the voices of a thousand
lost souls come to mine ear from the eternally
raging four winds of Heaven. Though my body
is in durance vile, yet my soul hath escaped from
its bonds, and gone forth o'er the wide ocean where
the spirit of liberty calleth aloud to all men from
its abiding place with Thee. Within thy bosom
the weary find rest and eternal peace. There none
calleth his brother Lord and Master, or grovels
like unto a blind worm in the dust. Under the
canopy of Heaven where thy star-lit banner waves,
lives a free people under the Law, weaving the
warp and the woof of its appointed destiny. In
their midst thou mayest find sanctuary. They
have chosen for their watchwords the twin satelllites
of truth, Order and Progress, and under the Aegis
of Liberty tread the narrow way that leads unto
Nirvana, yea even to the gates of Paradise.

DEDICATION.

In Canaan the fruitful soil beareth a hundred-fold, the streams pour forth a glad tide over the red earth, and out of the bowels of the mighty hills jewels rivalling the rainbow in their hues are cast, with fine gold and silver. Here man stands face to face with Nature, seeing his littleness in shame and awe. Alone on the verge of a beetling precipice thrice a thousand feet above the deep, call aloud to the Spirit of Life to bear up thy feet, lest thou fallest into Chaos. Here dwelleth Zeus, the all pervading, the true, intangible, omnipotent Master. Seekest thou God? Here may His presence be made manifest to thy Soul. Banish the Fetish that the man thy brother made for thee in the temple of Mammon. Shake off from Thy feet the miry clay that binds them to the slough of despond.

The way is straight, but leadeth unto pleasant pastures and untroubled waters. There thou mayest quaff the true nectar and ambrosia of the Gods. Arise then O sluggard and depart thither. Spy out the land, for it is good.

Flocks and herds multiply exceedingly, and behold thou art become a man, and rememberest the days of thy servitude with amazement. I say unto thee, go West, seeking a refuge in the place that I have told thee of. Go and prosper.

J.C.O.

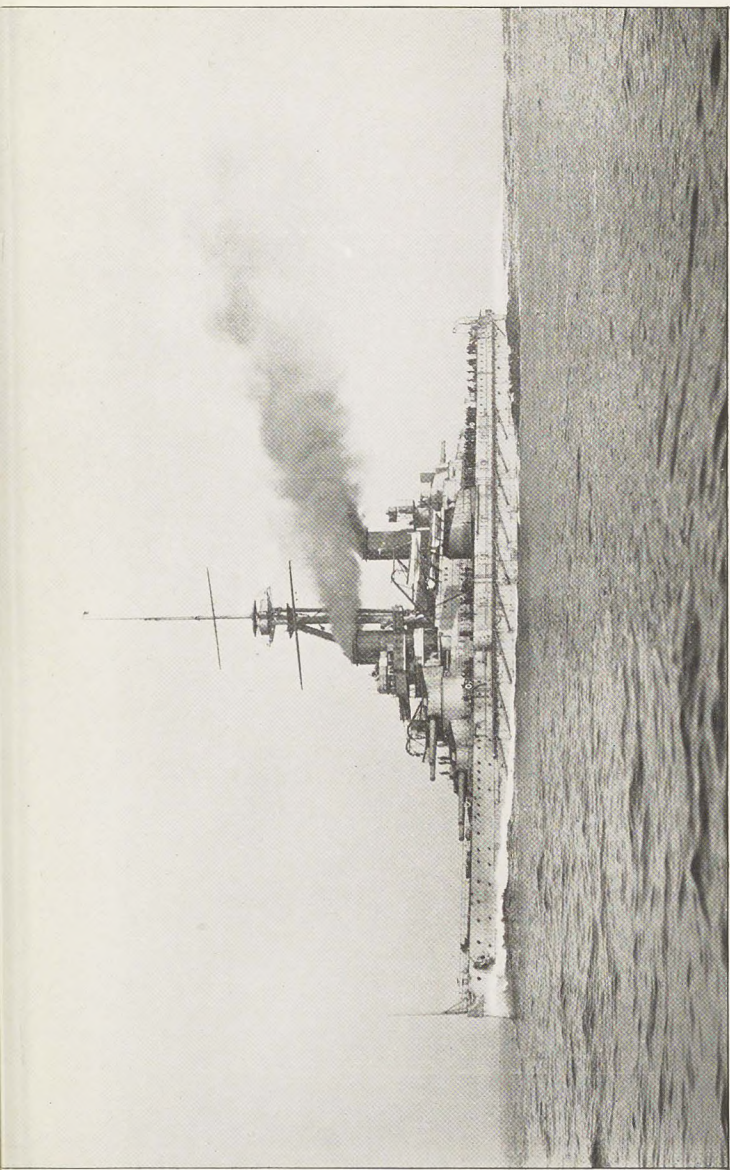
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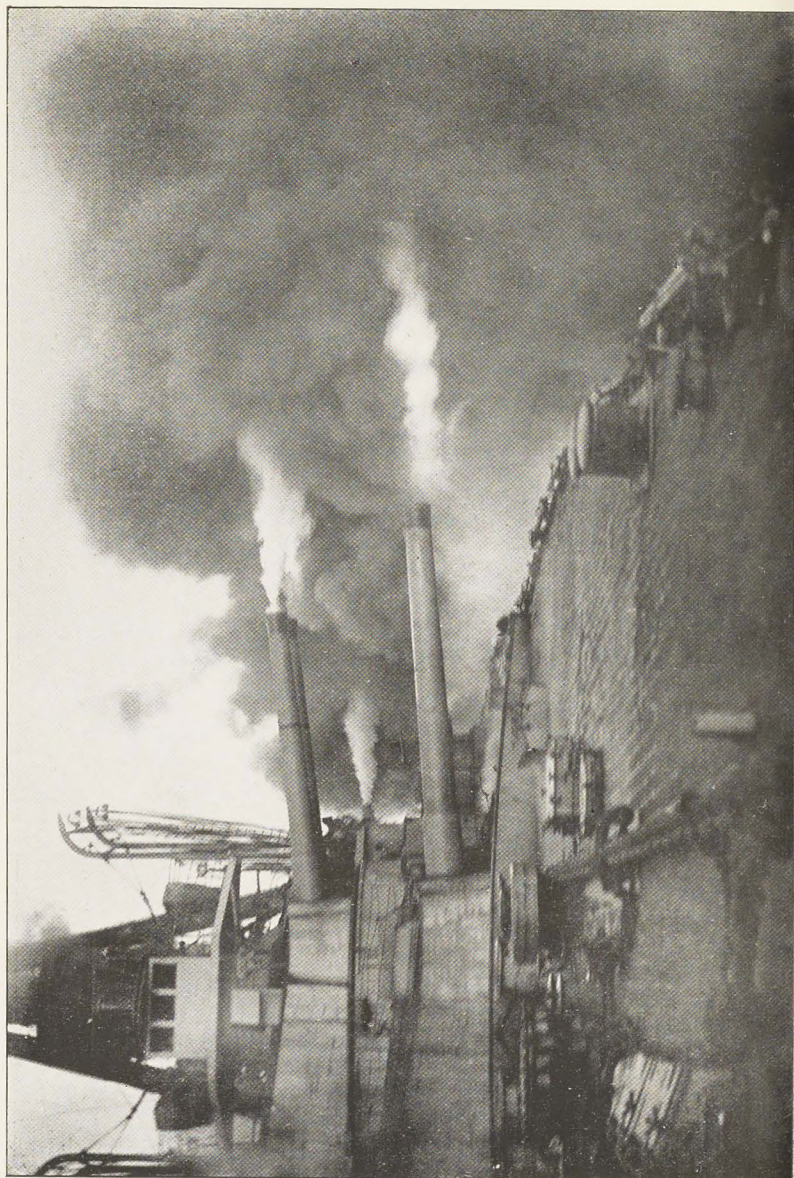
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THE "MINAS GERAES," THE WORLD'S LARGEST AND MOST HEAVILY ARMED BATTLESHIP,
On trials (1909) steaming at 21.4 knots.

ARTILLERY TRIALS OF THE "MINAS GERAES," AN HISTORICAL PICTURE,
Marking an era in naval construction ; firing ten 12-inch guns at a broadside, heavy artillery superimposed.



Introduction.

THE task which confronts the conscientious writer who attempts to deal adequately with such a vast country as Brazil, is so gigantic that he may well pause before undertaking it. The very fact that so many writers have failed to present a satisfactory picture, in spite of their undoubted literary ability, has increased the difficulty of the undertaking. When it is understood by the reader that the Brazilian Republic is an agglomeration of states with different, and sometimes conflicting interests, that these states are situated in quite different zones, whose climate and productions are as varied as those of Europe and Africa, and that many different factors have been at work to determine the development of character and idiosyncrasy, he may perhaps appreciate the labour entailed on one who wishes to give a truly comprehensive view of the country, its past, present, and future, and its productions and possibilities, as well as some idea of its rulers and public men.

There are many particulars in which Brazil offers a contrast to her neighbours, and racial differences are not the least modifying ones.

A casual visitor to Rio de Janeiro or São Paulo has no proper conception of the native character. If he is

a lion, he is hurried through a round of excursions and banquets, and presentations to this or that notability. Probably he is met on the steamer, and personally conducted, as it were, from one object of interest to another, until the all too brief period of his visit has come to an end, and he flits off to Buenos Aires and elsewhere, to go through the same performance over again. During an experience of many years, I cannot remember any really important or observant guest of the nation who had sufficient time to see more than that which he was especially desired to. Within the last two or three years there has been a procession of celebrities passing across the stage. Their parts have all been rehearsed for them, and (as desired) they have returned home to France, Italy, etc., to sing the praises of the glorious and great Republic. Now, I state it as an indictment of the British, that it is many years since an English savant has spent some time in Brazil. In spite of the glowing pictures drawn by Wallace, Burton, Bates, etc., the country is a real terra-incognita to the vast majority of Englishmen. There is no other land under the sun (and I say this without fear of contradiction) that offers so many opportunities to the trader, miner, naturalist, or simple tourist; the mountain lands of Minas, Goyaz, Matto Grosso, etc., etc., are real health resorts, where one meets with no extremes of climate, and encounters no demonstrations of nature's awe inspiring and all destroying forces.

To come back to the people. One finds outside official life, the surviving aristocrats, as a rule, quiet, dignified, and often striking looking men, of a philosophic turn of mind.

Let us analyse the man in the street. As a rule he is pretty well informed, and his education is usually

superior to that of the average in his class in England. He has a working knowledge at least of French, and his Mecca (like that of all Latin Americans) is Paris. There is even a shop in the gay Lutetia where one may buy the making of peculiar and distinctively Brazilian dishes. The same feeling that separates the Englishman from his transatlantic cousin is to be found in the relations between the Brazilian and Portuguese peoples.

Those who are prone to attack certain petty vices of the Brazilian of to-day, whether European born or otherwise, must again cast their eyes in the direction of the first great American Republic. There are no inherent faults in the Brazilian that one does not find intensified in the north. Youth cannot possess the calm reflection and staid customs of the mature. Their defects are those of their qualities, and if (as may be devoutly hoped) the Republic succeeds in uniting all its diversified parts into one really homogenous whole, these defects will disappear. A great deal of my belief in the future of this great nation lies in the earnest efforts now being made to educate, *and properly educate*, the people. Where else, for example, could one find the children of a Secretary of State sitting side by side with the peasant's sons on the bench of a public elementary school. The intellect of the people is keen, they are good material to work on, and they are (almost without exception) musical. In the few years since their real history began they have produced many men of real scientific attainments, and their literature is rich from every point of view. Without the slightest attempt at flattery, I assert that this people are destined to fill the same place in South America as the United States in the north. Comparing their diplomats, for example, with those from the old European nations, there is nothing whatever in the

balance in favour of the latter. The Hague Conference is a case in point, and only one. The annals of the country furnish many others.

Before commencing the story of Brazil in detail it is necessary to remind the reader that the great distances between different parts of the country render it always difficult, and sometimes impossible, to obtain definite information on some subjects. The work of the Official Information Bureau itself, at headquarters in Rio de Janeiro, has been hindered by the ignorance or apathy of certain provincial functionaries. This is, of course, inevitable. No need to go further afield than an English country town to discover the obstructive abilities of the petty parochial dignitary. Taking the disadvantages under which they work in Brazil into consideration, and the newness of everything, I think wonders have been done. It must also be distinctly understood that politics play a not inconsiderable part in the development, or non-development of a nation.

I must then ask the indulgence of the critic, in case of any short-comings, and trust that my efforts to marshal an army of facts and figures have been so far successful, and that the book fills a want which undoubtedly existed. I cannot pretend to have made no use of the scissors and paste pot, but claim at least to have borrowed that which is useful, and done my best to make of many parts a reasonable whole, added to, and altered where necessary in conformity with the needs of to-day, and more especially of to-morrow, for it is of the future that I have been especially thinking whilst compiling this work; to the future we must look, and in the future hope.

I must take this opportunity of expressing my indebtedness to the Press, for the flattering way in which it

INTRODUCTION.

received the edition of 1909, and my thanks are especially due to the Editor, *Bulletin of the International Bureau of American Republics*; Editor, *American Mining Journal*; Editor, *Le Courrier du Brésil*; Editor, *Brazilian Year Book*; Editor, *Journal of the Royal Society of Arts*; and the Director of the Commission of Economic Expansion of Brazil, abroad in Paris, for many blocks and figures used in this edition, and to Leopold Claremont, Esq., for valuable information extracted from his splendid book, "The Gem Cutters' Craft," and finally to the compilers of many Government Reports containing reliable official data and other notes. Also to H. Pearson, Esq., for the loan of photographs and maps.

CHAPTER I.

Geography and Topography.

ALMOST the whole of Brazil is in the Southern Hemisphere. It attains its greatest dimensions between the Equator and the Tropic of Capricorn. The only South American countries which are not in contact with it are Chili and Ecuador.

The Atlantic Ocean forms the natural boundary on the east and a greater part of the north, for an extension of about 5,000 miles, from Cape Orange, frontier of Dutch Guiana, to Chuy on the boundary line of Uruguay. The number of degrees from north to south are about 37, and between Pernambuco, on the eighth parallel south of the line, and the Cordillera of the Andes, there are as many east to west, or a distance of 4,350 kilometres. In area, Brazil is nearly sixteen times as large as France, and excluding Alaska from the United States, she is the fourth largest country in the world. A most remarkable fact may be noted, viz.: that there are few natural harbours or bays of a great size, those of San Salvador (Bahia) and Rio de Janeiro being by far the most important. To make up for this, however, the river system is a magnificent one. Americans are proud of calling the Mississippi the father of waters, but its volume is far less than that of the Amazon. This gigantic stream freshens the waters of the ocean for a distance of at least 180 miles out. It is (as is the

Paraguay) navigable throughout its course. The latter river rises in the State of Matto Grosso, not a great distance from the head waters of the Tapajoz, the last great affluent of the Amazon on its course to the sea, but, unlike that river, its course is almost due south from its source to its junction with the Paran , at the point where Paraguay touches Argentina. The Paran  itself rises in the range of mountains (known by its name) which forms a natural boundary to the State of Goyaz, on the east. These mountains also contain the source of the Tocantins, which falls into the sea by Par , whilst further west, in the same state, springs the Araguay , which joins the Tocantins at the junction of Goyaz with Maranh  and Par  on the north. The Madeira river, from the Bolivian Acre (now Brazilian), and on the northern bank of the Amazon, the River Negro, are the other two important tributaries of the great stream. Coming eastward we find the Parnahyba between Maranh  and Piahy, and then there are no more considerable streams till we encounter the S o Francisco, which rises in southern Minas Geraes, and wends its way right through the central part of that state and Bahia, before turning eastward, and taking a tremendous leap of 286 feet at the falls of Paulo Affonso, and so to the sea at Sergipe. We have now only to consider the comparatively insignificant Jequitinhonha, from central Minas to the coast at Belmonte, and the Parahyba, which forms the western boundary of the State of Rio Janeiro. Where Argentina, Paraguay and Brazil meet, and the Iguass  join the Paran , we find one of the world's wonders, the seven falls of the latter. The Iguass  itself is noteworthy for a vast semi-circle of cascades, the largest of which is 200 feet high. There are several other rivers which empty themselves into the

Paraná, as the Paranapanema, and Rio Grande, and the Tieté flowing through the city of São Paulo. These, together with the Uruguay (bounding Rio Grande do Sul State on the north and west), all rise in the coast ranges, or in their offshoots, on the Atlantic side.

We have then a vast network of streams watering almost the whole of Brazil. The volume of some of the principal rivers gives a somewhat clear idea of the enormous extent of territory through which they wend their way, and the sketch map at the beginning of the book will demonstrate their relative position and course.

Amazon—basin, 3,356,400 square miles; length, 3,380 miles. This does not include any part of the river extra-Brazilian.

NORTHERN AFFLUENTS.

Rio Negro—basin, 429,000 sq. miles; length, 1,020 miles.
 Japurá, ,, 186,000 ,, ,, 2,779 ,,

SOUTHERN AFFLUENTS.

Javary — basin, 45,600 sq. miles; length, 573 miles.
 Juruá ,, 144,000 ,, ,, 1,200 ,,
 Purús ,, 233,200 ,, ,, 2,190 ,,
 Madeira ,, 637,600 ,, ,, 3,000 ,,
 Tapajaz ,, 258,300 ,, ,, 1,158 ,,
 Xingú ,, 237,000 ,, ,, 1,260 ,,

The Tocantins is 1,560 miles, the Araguay 1,080 miles, the São Francisco 1,820 miles, and the Jequitinhonha 680 miles long.

Supposing one wished to travel by water from Cuyabá in Matto Grosso, to Manáos on the Amazon, the distance would be from Cuyabá to Rio Janeiro, via River Plate and Montevideo, 3,242 miles, Rio Janeiro to Manáos,

3,204 miles, total distance 6,446 miles, and it would be necessary (at present) to allow at least six weeks for the journey, which would be performed in Brazilian steam-vessels the whole distance. It might, however, be possible in a very wet season, to go by canoe (with perhaps a little portorage) from Cuyabá into the Amazon direct. The voyage might thus take a third or a fourth part of the time.

By looking at the map, one may see that there are very few spots indeed in Brazil that are not well provided with water. The natural source of most of the rivers seems to be the central plateau, and the majority flow either south or north, from the States of Matto Grosso and Goyaz. As we have already remarked, a narrow mountain chain forms the watershed, in many cases, of two rivers whose course is widely divergent. Thus, we may call Brazil a country of many mountains. This is due naturally to the erosive influences of the rivers throughout the ages dividing and multiplying the mountain ranges. We shall observe a curious instance of this if we turn our attention to the Serra da Sincora, in the State of Bahia. The river Paraguassú has, with its feeders, separated that range into three or four distinct sections, confronting each other.

More than half of Brazil consists of an elevated plateau cut into by a vast number of rivers. The mean altitude is from 2,000 to 3,000 feet, with isolated ranges up to 7,000 feet, and one peak (Itatiaia) reaching over 9,000 feet. We find the highest summits along the eastern side of the country, near the sea, and in the centre forming three long chains separated by the basins of the São Francisco and Paraguay rivers. Thus the elevation of the land is by no means commensurate with the length and volume of the rivers, and it may perhaps be safely

asserted that the accident of the topography is responsible for the extent of the fluvial system.

There are, then, four quite distinct mountain ranges:—

(1) The Andes, and their offshoots, in which nearly all the great tributaries of the Amazon find their sources, in territory extra-Brazilian.

(2) The ranges which separate the valleys of the Amazon and the Orinoco, and which divide Venezuela and the Guianas from Brazil.

(3) The central plateau, rising in various localities, into elevated peaks. This covers the greater part of Matto Grosso, Goyaz, central and western Minas and São Paulo, Pernambuco, Piauí and Maranhão, and forms the watershed of the Paraguay, Paraná and Uruguay rivers on the one side, and of the lower tributaries of the Amazon on the right bank, and of the Tocantins and the branches on the left hand of the São Francisco on the other.

(4) The coastal ranges, extending from the São Francisco river on the north, to the southern part of the State of Rio Grande. Here we find the sources of all the minor streams that discharge their waters into the Atlantic, as far south as the River Plate basin. These ranges are practically unbroken. There are no extensions of plain or wide valleys intervening. Here and there they approach quite close to the sea, in the vicinity of Rio Janeiro and Santos notably, and lower down they recede, leaving a wide alluvial strip in the State of Rio Grande, and in the north, in Bahia (at Cannavieiras), a boggy district, but in general the line is more or less parallel to the coast, and like it, shows no very great tendency to become broken or undulating.

The coastal range is however divided into three

distinct parts. The first, called the Serra do Mar, is very near the sea, and lies principally in the States of Espírito Santo, Rio de Janeiro, S. Paulo, Paraná, and Santa Catharina. In the State of Rio it is partly bounded on the west by the Parahyba river, which forms a natural limit in this direction. Its highest point is Itatiaia, considered to be the culminating peak of the Brazilian mountain system. There are many different figures given for its altitude, but 9,000 feet is as near as possible. To the northward of the city of Rio, a short spur (separated from the rest by the Piabanha stream) is known as the Serra dos Orgãos (Organ Mountains). Here, within 40 miles of the capital of the Republic, we find a mean altitude of 6,500 feet, with one or two summits (Itaiassú) reaching 7,000-7,300 feet. The massif of the latter peak is noteworthy for being isolated on the east from the main range of the Organs, by tremendous precipices. At Theresopolis ($2\frac{1}{2}$ hours from Rio) we find the finger-like peaks, which give their name to the range. The southern half of the Organ Mountains is known as the Serra da Estrella, and reaches in the Cortiço (near Petropolis, two hours from Rio) about 4,500 feet, or some 2,000 feet above the valley in which lies Petropolis (the summer residence of the well to do). Behind Rio Janeiro itself we find the Corcovado (hunchback), 2,200 feet. The Tijuca, 3,400 feet, and more to the north, an isolated mountain of somewhat different formation to the surrounding peaks. It is called Tinguá, and gives its name to some curious mineral found in nodules, and known as Tinguáite. Its origin has been presumed to be volcanic, although no crater can be said to exist now.

The second range (Mantiqueira) lies in the States of S. Paulo and Minas Geraes. At Itatiaia, or near it, it be-

comes allied to the Serra do Mar, thus this mountain may be said to belong to two systems, as it may be stated to be in two distinct states. Like the Tinguá, it is of a different nature to the others in its vicinity, being composed mainly of later eruptive rocks, such as syenites and phonolites. The crest of this Mantiqueira Range lies at an average of 6,500 feet above the sea, thus forming the most dominating and imposing mountain chain in the east of South America. Its direction from the valley of the Tieté is N.E. generally, contrary to that of the third section of the system, the backbone of Brazil, as it is called (Espinhaço), which trends N.W. This latter forms part of the eastern edge of the São Francisco basin.

The most important mountains in the Mantiqueira, beside Itatiaia, are situated near the pass by which the central railway makes its way westward at Barbacena. This little city has an altitude of about 4,000 feet, and may be termed the gate of the mineral district.

In the Espinhaço Range we find Itacolumí (near Ouro Preto), 5,700 feet; Caraça, 6,300 feet; Piedade, 5,800 feet, and Itambé, 6,000 feet.

In Goyaz we find the Pyrenees, attaining, it is said, nearly the height of 8,000 feet, and the Serra da Canastra reaching 4,200 feet.

The Paraná Plateau (Campos Geraes) extends into Santa Catharina and Rio Grande do Sul, and thrusts out spurs into Minas and São Paulo, and its maximum height is about 4,000 feet, with a mean level of some 2,000 feet. The broken series of mountains to the west of the São Francisco, in Minas and Bahia, attain some 2,500 feet.

It should be noted that the triangulation of most of the peaks in every state, but São Paulo and Minas, has not been completed, and that in consequence most of the *old* maps are topographically incorrect.

CHAPTER II.

Climate and Diseases.

It is impossible to speak of the climate of Brazil as a distinct concrete thing. The country is so immense, and its topography, as we have seen, so varied, that it has at least three different zones. Generally speaking, we find that the latitude in Brazil has hardly anything to do with its climate. Of course, it is naturally warmer (on the coast) in the winter at Pará than it is at Rio Grande, but the maximum summer heat is quite as great in all probability in the latter state. The average temperature of Pará is 26° centigrade, or 78° Fahrenheit. In spite of this rather high percentage (owing to the absence of winter, as far as loss of solar heat is concerned), the death rate is only 20 per thousand per annum. To show how figures prove misleading at first sight, we may note that Rio de Janeiro (within the tropic of Capricorn) has a maximum temperature of about 37° centigrade (98° Fahrenheit), whilst Buenos Aires (11 degrees further south) has a maximum of 105° Fahrenheit (shade). How can one account for such apparent anomalies? To understand the reason for this, one must consider the question of winds, and therein lies the secret of the relative healthiness of places lying well within the tropics, and in some instances almost on the line itself. We shall now proceed to deal systematically with the three different zones into which we propose to divide Brazil. It may be

safely concluded, in fact boldly asserted, that the climate of Brazil, generally speaking, is quite suited to European colonists, whether from the north or south, and any government warning its subjects to the contrary acts either in blind ignorance, or stupid antipathy, with some reason for its calumny which may not be very difficult to ascertain. To those who are inclined to listen to warnings as to the unsuitability of the climate, I would say—Reflect, and see if the detractors have any other reason besides that of the welfare of the enquirer.

The average temperature of the first, or tropical zone, is 25° centigrade (77° Fahrenheit), but it must be divided by its relative humidity into three parts. (1) The upper Amazon; (2) the interior of the States of Maranhão, Pará, Matto Grosso, Piahy, Parahyba, and Pernambuco; and (3) the coast line itself.

In the first region, the season of rains is from February to June. From the middle of October till January there is a modicum of wet weather, and from July to October, and January to February, the weather is dry. The temperature rises and falls rapidly in some parts of the Amazon valley. Now and then the thermometer has marked only 51° Fahrenheit. Although the day may be too hot, as soon as the evening approaches, the influence of the breeze is felt. Agassiz noted that a peculiarity of this climate was the almost continual action of a wind blowing from east to west. Maury said: "The rains falling abundantly during some months are invigorating." It is very rare that the wind becomes violent. There is between the Amazon region and India, for example, the same difference as between Rome and Boston, U.S.A. The two cities are situated in the same latitude, but their climates are, of course, very different. It must not be supposed that the average minimum of 64° Fahren-

heit, and maximum of 98° Fahrenheit is uniform all over Amazonia. In the elevated parts of the state, frosts have been observed, and the climate may be considered as temperate. At a contest in Paris, in 1898, between 1,200 children, the first prize for healthy appearance and physical development was given to a boy who had been born in Manáos, of Amazonian parents. Longevity is common. An authenticated case is chronicled of a man who lived to 145 years. Malarial fevers, found in some zones in the valley, are identical with the Italian forms, and in the Campagna of Rome are far more dangerous and difficult to cure.

The dangerous parts of the Amazon valley are limited to a very small section indeed of the country. There are 204,000 square miles of territory where, to quote Bates (naturalist on the Amazon), the climate is glorious. According to Hartt, part of the plateau has the best climate in the world, and one finds in the Campos Geraes, at least 600,000 square miles of lands well suited to stock raising, and even the cultivation of such cereals as oats and barley, as well as wheat.

Wallace says: "The temperature is marvellous, and the nights are noteworthy for the balsamic perfumes wafted through the air."

Herbert Smith wrote: "I have travelled through Amazonas during four years, without the least touch of fever. There are no sunstrokes ever known in this country."

Orton says: "Pará is an invalid's paradise."

Bates says, further, "that Englishmen who have lived 30 years in Pará, conserve the same aspect, and the same freshness of colour as they had when they left their native land."

A British Scientist writes me: "During a residence in

Manáos, I gained more than two stones in weight."

The Medical Officer of a British cruiser, which penetrated as far as Peru, told me the health of the crew was very good all the while the ship was in the river.

The extension of this first zone may be calculated as from the second degree north of the line, to the tenth south. With regard to its diseases, there are *none* peculiar to the country, and certainly none which are not more the result of carelessness or unhygienic habits than of climatic or topographical defects.

Manáos is only some inches above the sea, and Pará about 22 feet, yet, surrounded as it were by water, they present the following remarkable figures.

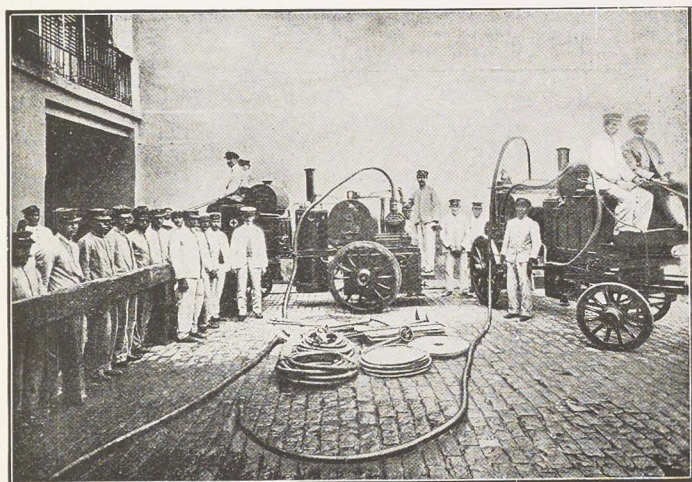
	Lat.	Absolute max. temp.	Absolute min. temp.	Death rate per 1,000.
Pará ...	1°27'	91° (Fahr.)	66° (Fahr.)	20·2
Manáos ...	3°8'	97° "	64° "	

Compare this with Madras, mortality 58·7; Bombay, 48·6; Mexico, 48·5; Lima, 34·7; Cairo, 34·6; Calcutta, 34·4.

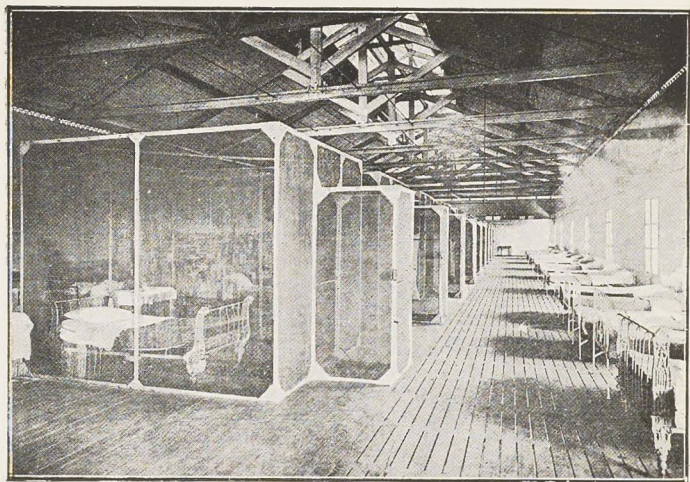
The second division comprises the interior of the northern states of Brazil. The prevailing winds are from the N.W. and from the S.E. They are now warm and humid, now dry and cold, causing variations in the temperature of as much as 68° Fahrenheit. In the month of August the day temperature has reached over 90° Fahrenheit, whilst at night the thermometer has gone down to 44° Fahrenheit. However hot the weather may be, the wind and the rain cause it to sink rapidly. The dry season lasts about two months, with, at most, two days' rain during this time, but an exception must be made of the States of Ceará, Parahyba, Piahy,



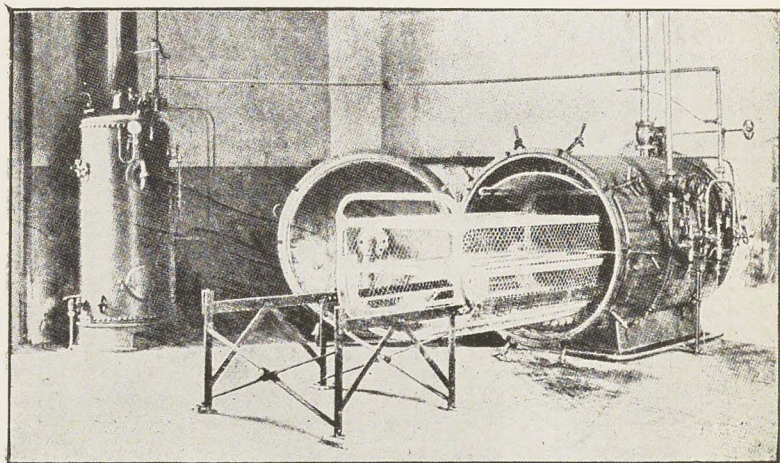
SANITARY CORPS,
Rio de Janeiro.



CLAYTON'S PUMPING ENGINES,
For disinfecting the sewers, Rio de Janeiro.



ISOLATION CHAMBERS
(protected by gauze) in São Sebastião Hospital, Rio de Janeiro.



FUMIGATING STOVE,
Campinas, São Paulo.

and Rio Grande do Norte, where the dry season sometimes extends to three or four months. The climate of the plateau of Matto Grosso is exceedingly healthy, the water is excellent, the air dry, and the temperature mild. There are no endemic diseases. Although this zone is within the torrid zone, frosts are frequently seen during the winter. There are also many parts of the States of Parahyba, Pernambuco, and Piauh, where the average temperature does not exceed 68° Fahrenheit. It must also be particularly noted, in comparing such a temperature with that of Great Britain, for example (of about 50° Fahrenheit), that the latter is greatly reduced by the low winter ratio. Presuming that in England we had winters such as in the south of France, the mean temperature would not be much less than that of the whole of Brazil. The maximum heat encountered in London is quite as high as Rio de Janeiro (or even Pará, with a difference of *50 degrees of latitude*,) whilst, as everyone knows, the extremes of temperature are extraordinary in the British Isles. I have noted a November reading of 12° Fahrenheit, and an August one of 95° Fahrenheit in the shade.

The extension of this zone may be reckoned from 10° south of the Equator, to the line of Capricorn, $23\frac{1}{2}^{\circ}$ south (about), comprising Sergipe, Bahia, Goyaz, Espirito Santo, Rio de Janeiro, Minas Geraes, almost all Matto Grosso, and the western part of São Paulo.

The third zone is to be calculated from the tropic of Capricorn to the southern frontier. It must be divided into two parts, the first comprising the coast line of part of Rio de Janeiro, São Paulo, Paraná, Santa Catharina, and Rio Grande du Sul, where there is an average temperature of not more than 66° Fahrenheit. The climate along the whole of this zone, and indeed much further

north, is very equable. The Serra do Mar, being very steep on the Atlantic side, and covered with luxuriant and dense vegetation right up to its summits, or to within four or five hundred feet of them, attracts the rain and retains humidity. The highest point attained by the mercury at Rio Janeiro, shut in as it is by high mountains, is quite 6° lower than at Paris. If we take the train northward, after crossing the bay at Rio, we shall find in two summer resorts, one 3,250-ft. above the sea, has a mean temperature of 60° Fahrenheit, with a maximum of about 89° Fahrenheit, and a minimum, July-August, of perhaps 28° or 29° . The other, situated 2,500-ft. above (and so near Rio that the city may be seen from the summit of the pass in fine weather), has a mean heat of 64° Fahrenheit, a maximum of 91° - 92° Fahrenheit, and a minimum of 1° below freezing point. Novo Friburgo, situated some little distance further on another line, is 2,845-ft. in altitude, and has a mean annual temperature of 62° Fahrenheit, a maximum of 75° Fahrenheit, and a minimum which marks freezing point. The salubrity of the capital itself is unquestionable, being about as low in death rate as Paris and Berlin. Santos is now quite healthy, and yellow fever may be said to have *entirely disappeared* from both cities. The greater part of the State of São Paulo, and southern Minas, and the higher parts of Rio Janeiro, as well as all the land still further south, is subject to frosts during some weeks of each year, but of course the days are delightfully fine and invigorating. The wet season is usually from December to April, but at the beginning and end of it, the rain frequently comes on after three or four p.m., and although it may pour in torrents all night, the morning is gloriously fine. Warning is generally given of the approach of a wet spell, by a week or two of oppressive heat during the day. After a good

storm, the air is crisp and invigorating, and one feels impelled to get out and up the hills. I should hardly imagine that there is a more agreeable climate than that of the mountain resorts during the winter (April to September). It is hardly possible to say there are more than two seasons, as flowers are blooming in profusion all the while, and one need never complain of either the heat or the cold. In 1907 there was an influx of new diplomats, and it was rather amusing to notice their complaints about the weather. They said they had not come to Brazil to be chilled to the backbone. To sum up, there is no doubt that in many towns of the interior, the mortality is not so great as in similar places in Europe, indeed in some cities, as Ponta Grossa, in Paraná, there are years without a single death. St. Hilaire, in speaking of this region, says, "There is no place in this world where an European might establish himself with greater advantage." The words of Wallace will prove a fitting termination to the unanimous chorus of appreciation: "In Brazil a man may, with six hours of labour, obtain more of the comforts and necessities of life, than by twelve hours work in Europe." The adventurer has nothing to fear. The death rate of this vast country will bear comparison with any other. Medical science is undoubtedly as far advanced there as anywhere, and as far as sanitary hygiene is concerned, Brazil took first prize at the great International Congress recently held in Germany. Personally speaking, I would far rather be in the most despised Brazilian city in the interior, than in a provincial European town.

It may be a recommendation or not, but within the short space of time of three years in the mountains, I gained not less than two stone in weight, in spite of the most active life, passing at least half my time, either

in the depths of the virgin forests or attacking the most difficult peaks, sometimes marching 16 and 18 hours a day, and getting but six hours sleep in the twenty-four.

A few extracts from the report of Mr. Milne Cheetham (First Secretary of the British Legation) for 1908 may not be out of place here, and they are the more noteworthy as being from a source entirely unprejudiced in favour of Brazil:—

“The climate of Rio de Janeiro is salubrious, and the yellow fever has to all appearances been practically stamped out. Sanitary measures, both in it and Santos, have been taken with beneficial results, the health of both cities having entirely changed during the last few years.”

“Much of the mortality, even in the most infected districts of the upper Amazon, is due to bad food in sickness and improper care.”

“The death-rate of many cities, moreover, is also raised by outside patients. The highlands of Brazil are extremely healthy.”

“In the month of April last (Autumn) readings of the thermometer were as follows:—

Rio de Janeiro	...	70° to 80° Fahrenheit.
Pará ...	...	77° Fahrenheit.
Ceará	...	84° ”
Pernambuco	...	82° ”
Bahia	...	78° ”
Espirito Santo	...	80° ”
São Paulo (city)	...	67° ”
Curityba (Paraná)...	...	65° ”
Florianopolis	...	64° ”
Porto Alegre	...	64° ”

The death-rate, as we have seen, is about 20 per thousand annually. The birth-rate is:—Rio de Janeiro, 25·18; Porto Alegre, 27·73; Florianopolis, 34·73;

Curitiba, 33·45; São Paulo, 35·63; Fortaleza (Ceará), 35·24. The births for the State of São Paulo in 1907 were 108,438, whilst the deaths were 50,000. The birth-rate for London is but 20 per thousand. There are in France 184 centenarians to 38,000,000, whilst in the city of Rio de Janeiro alone (population 811,000) there are 178.

The ratio of density of population in Rio is as follows:—

As compared with London, 20 times less.

„	„	Berlin,	40	„
„	„	Paris,	50	„

and she has more houses than the latter city, with a population of 2,700,000.

Fletcher and Kidder (*see Bibliography*) say, on page 268: “It would seem as if Providence had designed this land for the home of a great nation.”

Bigg Wither (“Pioneering in S. Brazil”): “There is ample timber, water and pasture, and *air than which none purer or more invigorating can be found in the whole world.*”

In conclusion, it may safely be stated that a constant influx of colonists from every part of Europe, and even from Asia (Syria) has largely increased the mortality in all the more accessible parts of Brazil. This has been due to the abominable conditions under which the greater number of these people travel to Brazil, and also owing to the too frequent incapacity of the ships' doctors. It is notorious that the steamship companies pay usually a nominal wage to such medical men, who are either without means to establish a practice of their own, or prefer such service for the sake of their own health. Frequently there are more than 2,000 persons crowded together within a limited space, with one physician to attend to their needs. Many of the poor emigrants either embark with the germs of disease within their systems, or contract it on board, owing to the bad diet and want

of exercise. This is more especially true as regards the little ones, but a great deal has been done of late by most of the better class lines in the provision of new steamers, fitted with 2, 4, and 6-berth cabins for families.

During 1908 there were disembarked in the port of Rio de Janeiro 46,216 immigrants (3rd class passengers) belonging to 39 distinct countries. Amongst these there were but 293 British; the great majority being Portuguese, 23,287; Spanish 5,519; Italian 3,764, and Austrian 3,903.

In the whole of the year, of this 46,216 there were but 26 (*twenty-six*) deaths in *all* the public hospitals of the capital. Many of these people, it must be remembered, lived under the most unhygienic conditions in their native lands. The Portuguese and Spanish peasants living, in many cases, on the most meagre and unwholesome diet, and the children being brought up (if one can use the expression) without any knowledge on the part of their parents of a proper food for little ones, even if they had the means to supply such. Mantegazza, the Italian writer, has described luridly enough the conditions in the latter country, so it is not necessary to enter into them. I will content myself with stating that in all the southern countries of Europe it is the almost universal custom to give babies of the most tender age the coarse rough wine of the land, and it is small wonder that the newcomer is largely responsible for the death-rate in Brazil. Finally, it may be frankly asserted that the immigrant, and the negro and mulatto of the lower classes, between them account for some 75 per cent. of the mortality. If we strike a fair balance, we shall then find that Brazil is assuredly one of the healthiest countries in the world, and that no other tropical or semi-tropical zone can possibly rival it, even as far as salubrity is concerned.

CHAPTER III.

Ethnography.

KEANE divides the aboriginal Brazilians into four great groups, or families, namely, Cariban, Arawakan, Gesan, and Tupi-Guaranian. The physical features of the country closely connect themselves with the inhabitants, but there is no correspondence between the configuration of the interior and its political divisions. Both the racial constituents from which the American type was developed appeared in Brazil. The later neolithic Mongolian immigrant, who came by way of Behring Strait, represented advancing peoples probably more numerous than their pleistocene predecessors, and also possessing a much higher development. Survivals of this type would, therefore, seem as if they should be more widely scattered, and distinctly marked, when compared with the ruder, fewer, or less formidable men. There is, however, no doubt about these Brazilian Proto-Mongols. As Burton remarks, this strain demonstrates itself in big, round Calmuck skulls, flat faces, with broad, prominent cheek bones, oblique oriental eyes, rather brown than black. They have also dark, thick eye-brows and thin moustaches fringing large mouths, with pointed teeth, and sparse beards, hardly covering the long, pointed chin. Variation, through vast ages of wandering, produced another sub-race. It came to the southern continent when the climates of the

far north were much milder, and there were no spaces of open sea between Scandinavia and Greenland. These (the first arrivals in all probability) were scattered widely over the country, principally due to the pressure exerted by the hordes of invading Asiatics. They seem to have become more or less concentrated in Minas Geraes, and it is supposed that this state is the centre whence subsequent migrations took place.

In the new world these stout, dark men, with narrow skulls, receding foreheads, flat crowned incisor teeth, and projecting jaws, form a separate group that was exterminated, absorbed, or driven into remote and isolated regions. Keane supposes them to have held their own for some time against the invaders, but according to the scientific dogma of Von Virchow, prognathism is not compatible with normal intelligence, and, therefore, this stand could not have been of long duration.

Tribal catalogues and philological analyses will go but a very little way towards bringing these groups into view as they are. Information contributive towards this end is very unequal with respect to different families, while for all of them the constant intercrossing, wandering, regrouping, and decay, have done their work in the way of modification and destruction. Whole populations have vanished, leaving hardly a trace behind. In others they have been so broken up, that their very tribal names and original languages have been entirely lost. The mode of their life, in very small communities, continually sub-divided by the slightest dispute or difficulty, was a very potent factor in their disappearance. Mirhanas, for example, is an arbitrary title for a multitude of indistinguishable ethnic fragments, including about half of the Indians in the valley of the Amazon.

Carayas is a term similarly applied to those in the

basin of the Tingú and Araguaya Rivers. Those Indians called Coroados are so termed, because of their tonsures. Botucudo means one who wears a botogue or labret (an ornament of shell or bone inserted into the lip).

Tapuyo, originally signifying stranger or barbarian, is now synonymous with a savage well disposed towards foreigners. Caribs cannot be traced beyond Central Brazil, where they appear to have originated. Although these latter had a reputation as warriors, the fugitive slaves, fighting by their side, far excelled them.

Carijones, with Witotos, on the Amazon, are also affiliated to this group, as are likewise some scattered bands of Pimentaires roaming the borders of Pernambuco and Piauhý. The manners and customs of these tribes were (and are) so dissimilar that it is easy to understand how it is they never formed a real nation, and even to-day do not advance a single step towards civilisation, unless taken in hand by the white man. It is supposed that the flat heads found in certain regions of the plateau are derived from unions between the conquering Europeans and the Caribs. The Arawaks of Guiana call themselves Loconos (or natives). They are widely distributed in Brazil, but their origin is impossible to discover. Like many other groups, the tribes are hardly more than large families, each under its own elder. They are, contrary to the Caribs, very cleanly in their habits. They have adopted many European articles, whilst the latter live in filth, and reject all foreign improvements. There is, however, an offshoot of the Arawak group (Warrans) possessed of much ability in canoe construction, and having the virtue of thrift, but indescribably dirty in their ways. The Carib distorts his limbs by ligatures, uses the labret, arrays himself in feathers, skins, and hand-made fabrics, whilst the Warran

seems to be entirely destitute of personal vanity, is more stolid than his neighbours, and not being so well developed physically, hard work soon exhausts him. Both these loosely connected hordes build temporary huts of branches of trees, and wherever the Warrans are permanently established, they construct pile dwellings.

All of these races living in the wide river basins are in the habit of proceeding to the most extravagant excesses. These orgies are, of course, succeeded by periods of morose, surly depression, culminating in destructive impulses. Primary traits having a true value for classification purposes, are more marked amongst the Gessan than in any of the other families inhabiting Brazil. They had this name from Von Martius, who took the common terminal of tribal names for a collective designation. This individuality (Botucudo, as Kean calls it,) in large measure, escaped the process of evolution, which created a distinct American type out of entirely different elements coming from opposite quarters of the globe. They preserve those characteristics which distinguished their paleolithic European progenitors. When taken en bloc the mental inequality shown by divergent branches of other stocks, is here scarcely recognisable in varying degrees of aptitude, more or less skill or ingenuity, and an unequal response towards incitements that initiate progress. Gessan tribes have hardly become modified, they remain undeveloped, and no group of this family is otherwise than completely savage.

Caribs, Arawaks, and Tupis are sometimes indistinguishable. Structural survivals cut Aimores or Botucudos off from these, and closely unite them with proto-Europeans. Kayapos, Akuas, Cholengs, Kames, and several minor hordes represent a single group,

extending from Amazonia to La Plata. These are true aborigines, fragments of a mass broken up by Tupi-Guarani invaders, and the nearest representatives, and probably the direct descendants of that primitive race whose osseous remains have been found in the Lagoa Santa caves, and Santa Catharina shell mounds.

Botucudos, Tapuyos, Capayos, etc., in eastern Brazil, have not even reached the stone age, but although on the great Solimões one may travel for weeks without seeing a fragment which might be worked, every tribe within this latter region has contrived to remedy the deficiency. Botucudos use wood almost exclusively, and until lately were without hammocks, and lived entirely on such poor provision that badly equipped hunters could supply; their diet consisting of every kind of insect or reptile that might by any stretch of the imagination be termed edible.

Tupi-Guarani tribes are distributed by Deniker, over the plains of the Amazon and Orinoco, and in Guiana, and on the table lands of eastern and southern Brazil. This is a composite group, as indicated by its name, although the difference is largely geographical. Their ethnical constituents are, in fact, similar, but the Guarani branch are presumed to have come from Paraguay. It may be remarked in this connection that this country is full of the Guaranis to-day, the bulk of the menial service being performed by these Indians, so much so that it is frequently necessary for employers to learn Guarani in order to make themselves understood, even in the capital. Early missionary priests constructed a sort of lingua franca, which by degrees came to be known as Tupi, although the real language of the Tupis had originally a great range, covering about one-fourth of South America.

Tupi communities, purer in blood, and far more powerful than now, or at any rate much more numerous, were established on the Amazon itself, and all its branches. At present each has dwindled, and, except along the Solimões, it is impossible to find an unamalgamated population.

These groups, in common with most others, crossed in all directions, have mingled foreign strains amongst themselves, until by far the greater proportion are now Mamelucos (descendants of aborigines and white men); Mulattos, Cafuzos (crossed between Negroes and Indians); Curibocos, who combine Cafuzo with Indian blood, and Xibaros, the progeny of Cafuzos and Negroes.

Bates uses the term Tapuza for what he calls semi-civilised Tupis. Properly speaking none have reached this degree of social development, although in some instances there has been a greater or lesser adoption of civilised appliances. At certain places aborigines, or at least barbarians, masquerade as cultivated Christians, but this is all outside show. The savage remains at bottom.

When Cabral reached Brazil he found Guaranis established from Paraguay to Uruguay, in southern Brazil, and already united to Tupis. They were without clothing of any kind, although they used some personal decorations, which have since been abandoned. Nadaillac reports them as living in commercial settlements, usually consisting of four long houses built in a square.

Tattooing and scarification is still common, and they paint themselves with red and black designs, and use the labret.

This country exhibits every kind of stone implement, from the rudest paleolithic wedge, to finely-shaped arrow-heads of rock crystal, and the polished neolithic axe. There is no possibility of explaining why Botucudos use

wooden arrow tips when plenty of shells, stone, and metal are at hand, or why Caribs, Arawaks, and Tupis often prefer stone to iron.

The Gessan tribes advanced less than any others, and accomplished nothing representing the lowest degree of human life in communities. An average Botucudo hut is a rude bamboo erection, about 7 feet high and 9 feet wide. The openings are barely large enough to crawl through, and the interior is black with soot. Bugre settlements consist of a few of such structures standing in partial clearances in the forest.

These Indians are not more than 5-ft. 4-in. in height on an average, and their lower limbs have generally grown crooked. They cut off their coarse, black hair in front, and ornament it with toucan feathers, stuck on with wax. Every Bugre pulls out his eyebrows and eyelashes, and pulls down his under lip with a huge appendage, besides ornamenting himself (if fortune be kind) with a necklace, composed of rows of teeth; their bows and arrows are very inferior, and a kind of snare made of creepers, is more effectual against big game. They still carry stone axes, counterparts of those used in pre-historic times in Europe. Attempts to civilise these wretched beings have generally proved entirely in vain, and of 27 taken prisoners by Mr. Bigg-Wither, all except one boy died of a mysterious complaint, in spite of washing, clothing, and proper feeding; or in all probability, because of these improvements in their condition and appearance.

Near the coast, the *Lingua Franca* (or *Geral*) predominated amongst the tribes who had made their way thither from the central plains. Those Indians who have come into enforced and continual contact with the white man, are generally docile, but taken as a whole it is very

difficult to inculcate habits of order and cleanliness in them.

A peculiar characteristic of the whole of the Indian races is a deeply seated superstition. They believe in lunar phantoms and beings of light, who are spirits of good. They are afraid of certain dark shadowy forms, powers of ill, vengeful, and awful, whom it is necessary to propitiate. These are supposed to be the souls of their ancestors. They also believe in spirits of the deep waters, and are afraid of bathing in the dark, except in company, as traditions are current that many had been dragged down into the lakes and rivers, and never returned. A little reflection would have taught them the real, tangible cause of the loss of their fellows, as alligators are naturally very common in many parts of the country. In common with other primitive races, their natural powers of observation are very highly developed. Many of the tribes are capable of producing artistic ceramic ware, and they have some ability for wood-carving, and making grotesque masks. Some of them plant maize and mandioca, weave baskets, and construct large canoes, of course, by the hollowing out process, aided by fire. Amongst the River Indians harpoons are used, which are fitted with heads that become detached on entering the fish, or manatee, the shaft acting as a float. The tradition of a flood is current amongst them. It is related that the Chief Tamandaré, on the rising of the waters, took his wife in his arms, and climbed up into the crown of a palm tree, there he remained for three days and nights, until the flood began to recede. The palm, which had become uprooted, had floated into the middle of a plain, where it stopped, and Tamandaré descended, and saw that all other humans had perished. He remained on the spot with his wife,

and originated the great Guarani race, who were, like unto him, mighty and tall men.

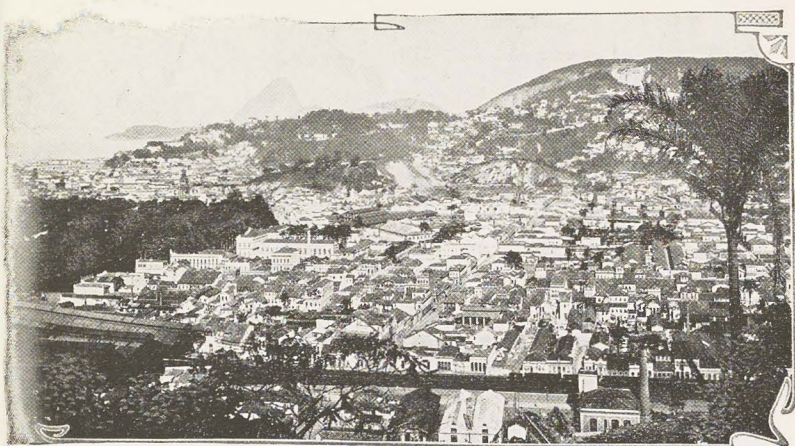
There were many legends circulating amongst this people, and they were in the habit of sitting round their camp fires to listen to a tale-teller, sometimes the whole night through. The dominating note in these stories, and indeed in the whole character of the race, was melancholy. They were (and are) a very musical people, and it is remarkable to notice how Brazilians to-day are devoted to melody. Hardly a town of the slightest pretensions, is without its band of music, in spite of the great cost of instruments (all, of course, imported). Many of these orchestras are quite good, and we find *free* schools of music established in the most unlikely places. Undoubtedly the aboriginal character is preserved amongst the white people now inhabiting Brazil. Traces are found of its influence in the mode of celebrating the carnival, in the very character of the national music, in its literature, and sometimes its art. The Negro, on the contrary, has not made himself felt to any great extent, of course, owing to his thralldom, as well as to his natural characteristics. The evolution of the Brazilian type is proceeding slowly, but surely, and out of the Sclavo-Teutons, Ibero-Tuscan-Romanos, Franco-Iberians, Syrians, and remaining aboriginal elements, is being constructed a composite, but none the less virile race, destined to play a great part in the future history of the world. The predominance of the white is assured. Colonisation is the predominant question of the day, and although such experiments as the introduction of Asiatic settlers (Japanese) are somewhat dangerous ones, there is no doubt as to the final result. Envy and ignorance may work hard to stay the progress of Brazil, but her advance to the position of a great nation is sure, and

even now she demands and obtains a prominent place in the world's councils. Who knows what the future holds in store for the "Colossus of the South," as she may fitly be termed.

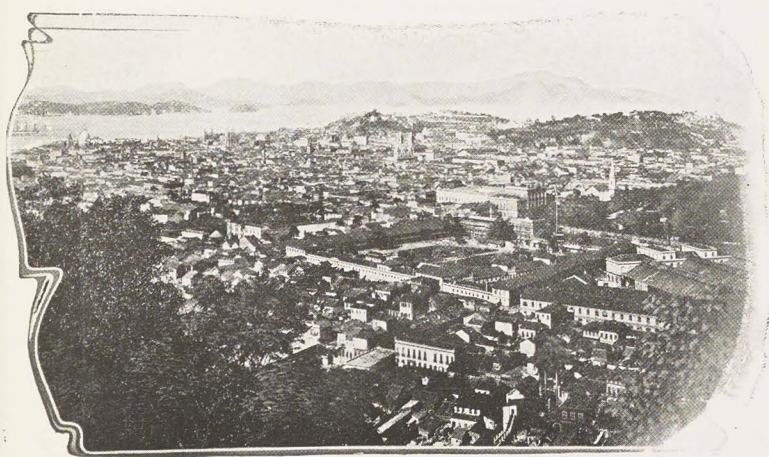
The greatest problem is, not the civilisation of the Brazilians, but that of the nations who send forth their multitudes across the seas, to the smiling valleys of the great Republic. If the right sort of colonists are sent to Brazil, the country will soon prove her fitness to take a place in the forefront of nations.

It seems very apropos of the subject of ethnography, to consider two diametrically opposed points of view, as far as the introduction of Anglo-Saxon colonists are concerned. The British Government warns its subjects that Brazil is not a desirable field for emigration, and as a retaliation, Brazilians frequently say—The Englishman is not suited to Brazil.

Which side does the truth lie? As far as the second hypothesis is concerned, it is easily demolished, for no one with an open mind will deny that the English yeoman represents the highest type of agriculturist, especially as far as his standard of education and living is concerned. Is not then the best more suitable than the inferior? The first dogma is not so easy to destroy, but I have done my best in this book to show the varied resources of Brazil, and those who think they are fitted to make a better living there than in England, must take the necessary steps to proceed thither.



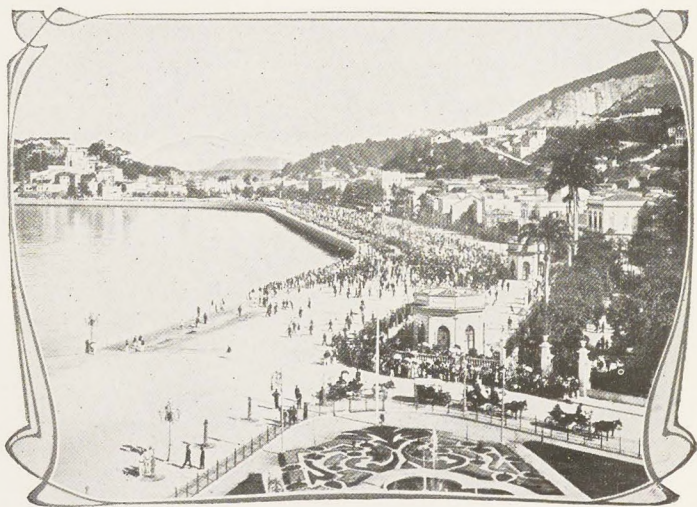
PARTIAL PANORAMA OF RIO DE JANEIRO.
The Sugar Loaf in the background.



PARTIAL PANORAMA OF RIO DE JANEIRO.



AVENIDA CENTRAL, RIO DE JANEIRO.



AVENIDA BEIRA-MAR (BOTAFOGO) RIO DE JANEIRO.

CHAPTER IV.

Historical, and the Army and Navy.

BRAZIL was discovered by the Portuguese navigator, Pedro Alvarez Cabral, on the 25th April, 1500, and he dropped anchor in Porto Seguro on Good Friday. The country was first settled as a penal colony, but the experiment was a failure, and a little later the country was divided into captaincies, and a number of different sections granted to nobles and other adventurers, whose conduct soon became so tyrannical that a Governor-General was appointed, and the feudal lords held their lands as fiefs only. During the next century, many attempts were made by the French, Spanish, and Dutch to obtain the mastery, and to hold various cities they had seized, but all of the invaders were finally driven from the country, and it was left in peace to develop its own resources. In 1699, the gold fields of Minas Geraes were discovered, and some 30 years later the diamonds. The interior of this state (and the neighbouring ones of Bahia, Goyaz, and Matto Grosso) was opened up and settled by the Bandeirantes, groups of adventurers from the State of São Paulo, who were attracted thither by reports as to the great wealth to be obtained in the search for the precious metal.

In 1808, the Regent of Portugal arrived in Brazil on the 25th of January, and a decree was made opening the

ports to international commerce. The Constitution was granted in 1821, but on the return of the King to Lisbon, the Portuguese Cortes repudiated it, and demanded the immediate regression of the young Prince, who disobeyed the mandate of Parliament, and proclaimed the independence of Brazil, and himself Emperor Pedro I., on September 7th, 1822. He was obliged to abdicate in 1831, and the second and last Emperor came to the throne in 1843. In 1865 the Paraguayan War commenced, and caused the loss of many thousands of lives, and an expenditure of £63,000,000. This campaign was brought to an end in 1870, and Lopez, the Paraguayan dictator was killed in attempting to escape. In 1888, slavery was entirely abolished, and in 1889, the Republic was suddenly proclaimed and the Emperor forced to leave Brazil for ever. The Provisional Government was formed under the leadership of Marshal Deodoro da Fonseca. In 1891, the Constitution of the Republic was formulated, and Floriano Peixóto took control of the ship of state. He was succeeded by the first civil President—Dr. Prudente de Moraes (1894), and Dr. Campos Salles (1898), and Dr. Rodrigues Alves (1902). Under this President, the plans for the re-construction of the capital were first put into operation, and in 1904, the splendid success of Brazil at St. Louis Exhibition paved the way for greater triumphs at the Hague Peace Conference, and the third Pan-American Congress attended by 80 representatives of 20 different American nations. The Brazilian Government installed in the building a complete telegraph, telephone, and postal service entirely free to the delegates. It also maintained translators, typists, and clerks, and nothing in connection with the comfort or convenience of the delegates was left undone. The conference was opened by Baron Rio Branco (Foreign

Minister), and a few words from his address are perhaps permissible :—

“As young nations still, we should not forget what we owe to those who have furnished the capital with which we have entered into the world of competition. The very immensity of our territories, in a great part unpopulated and unexplored, and the certainty that we have ample resources for a population twenty times larger, would suggest to us the advisability of strengthening our friendly relations, and trying to develop the commercial interests which we have in common. From Europe we came; Europe has been our teacher, from her we receive continual support and example, the light of science and art, the commodities of her industry, and the most profitable lessons of progress. What in exchange we can give for this, by our growth and prosperity, will certainly constitute a more important field for the employment of her commercial and industrial activity”

Another success was that of the Sanitary Department at the Berlin Congress, where Brazil took first prize.

In 1906, Dr. Alfonso Penna became President, but did not live to end his term of office, as he died after a very short illness on the 14th of June, 1909.

The Presidential Election that has just come to an end has been a remarkable one from several points of view. For one thing, it was the first in which two such redoubtable candidates found themselves in opposition, and in which a struggle was assured right up to the polling stage. The President Elect, Marshal Hermes da Fonseca, is the nephew of the head of the Provisional Government from 15th November, 1889 to January, 1891 (the fiery Deodoro da Fonseca), the dictator, whilst his adversary, Dr. Ruy Barbosa, was Minister of Finance, and actually (although not in name) Vice-President

during the same administration. The Marshal is a grandson, son and nephew of soldiers, and has served his country in every grade of military capacity, being Minister of War during the Presidency of Dr. Affonso Penna. He has for his programme the development of railways, public works, agriculture, and the general economical expansion of Brazil, and a settled policy of peace.

The Vice-President is Dr. Wenceslao Braz, who relinquished the Presidency of the State of Minas Geraes to take up the work of propaganda for a higher position. Dedicated to politics from his youth, he has been in succession State and Federal Deputy, and Minister of the Interior of his native State.

The names of the members of the Cabinet are not yet to hand, but it is possible that the Foreign Minister (Barão do Rio Branco) will be asked to retain his portfolio, as well as perhaps the newly-appointed Ministers of War and Agriculture. This is, however, mere conjecture.

Figures just to hand, give the following number of votes up to date—Marshal Hermes da Fonseca, 365,918; Dr. Ruy Barbosa, 174,300.

What has really turned the scale to such a degree would be impossible to explain within these limits so the facts must speak for themselves, besides this is not a book with any political news to hoe.

In 1908, the Great Exhibition to commemorate the centenary of the opening of Brazilian ports was held, and remained open from August to November. Amongst other noteworthy events of the last half decade, may be mentioned the starting of new Port Works at Rio de Janeiro, Bahia, Pernambuco, Pará, Victoria, and Rio Grande do Sul. The institution of compulsory military

service, the unification of railway control, and vast development of the system of lines in the Republic. The organisation of a Department of Colonisation and Propaganda, with a High Commissioner in Europe, and the reform in the Mining Laws, and revision of the Customs Tariff. Altogether it has been a period of great activity and progress; Brazil has a fair motto, and one which is amply justified. Her development is sure, and there is no branch of industry and commercial activity that cannot find an adequate recompense there. The forthcoming Exhibition at Brussels (May—October, 1910) will demonstrate to Europe, to what extent Brazil has profited by her natural riches.

Marine.

Next year, the present programme of the Government will, it is expected, be complete, and the Navy will consist of the following ships. It ought to be definitely stated first, that all rumours respecting the intention of Brazil of parting with either of her new Dreadnoughts are absolutely unfounded, and, as I had occasion to point out in the press recently, every vessel is needed for the purpose, not of attack, but of defence of coast line, and to ensure the prestige which is to-day Brazil's undeniable right. Instead of reducing the number of ships, it is possible that they will be added to in the future. The Liga Maritima (Navy League) of Brazil is working in this direction, and its 40,000 members (the British Navy League has 30,000) comprise the flower of Brazilian virility and intellect. It should be noted that the new battleships will be the first in the world with 12-inch guns in the upper towers.

THE FLEET (1911).

	Tons.	Speed knots.	Dimensions metres.	Armament.	
First Class Battleships.					
Rio de Janeiro	21.4	$\left\{ \begin{array}{l} 159 \text{ long} \\ 25.6 \text{ wide} \\ 7.5 \text{ draught} \end{array} \right.$	xii 12-in. guns in six towers.	
São Paulo ...	21,000			xxii 4.7 in. guns	
Minas Geraes			Broadside of 10 guns	
Coast Guard.					
Deodoro	3,162	15	...	16 guns
Floriano				
School Ships.					
Barroso	3,450	21	...	28 guns
Benjamin Constant...	...	2,820	14	...	16 guns
Scouts.					
Bahia	3,500	27-28	...	10 of 120-mm.
Rio Grande do Sul...	...				8 of 47-mm. 2 torpedo tubes
Torpedo Cruisers.					
Tupy...	...	1,190	22	...	10 guns
Tymbira				
Tamoyo				
Gunboats.					
Republica	1,300	16	...	10 guns
Tiradentes	900	14.7	...	10 guns
Destroyers.					
Pará, Piauí, Amazonas, Alagoas, Matto Grosso, Paraná, Santa Catharina, Rio Grande do Norte Parahyba, Espírito Santo	700	27-28	...	$\left\{ \begin{array}{l} 6 \text{ guns} \\ 2 \text{ torpedo} \\ \text{tubes} \end{array} \right.$	
Gustavo Sampaio ... and 3 others					500	18	...	6 guns
Two Torpedo Boats	190	...	...	$\left\{ \begin{array}{l} 2 \text{ of 47-mm.} \\ 2 \text{ torpedo tubes} \end{array} \right.$

Five Submarines (type of Holland), some other small vessels of different types, and 2 Auxiliaries.

The Army.

It is not intended to largely increase the military forces of the Republic, but to put them on a much better footing. The Government has lent its aid to the National Rifle Association founded in 1906, and this has branches in every state. It must also be remembered that the police are semi-military in character, and instructors have been contracted with from France, to drill the São Paulo force, which has a total strength of 5,000 men. In Rio de Janeiro lectures are given, and military evolutions are shown with the aid of the cinematograph. The War Department has also established a smokeless powder factory, and altogether with the very gratifying increase in the number of military volunteers, it is certain that the Brazilian military forces are in a very good condition to-day. By the law of 1907, every citizen is liable to serve from 21 to 44 years of age; 2 years in active service, and 7 in the First Reserve. Peace footing of Army 18,000.

CHAPTER V.

Area, Distribution of Population, and Immigration.

THE first census was taken in 1872, and the last in 1900, and the estimated population is given up to 1908. It must be understood, however, that with a large number of savage and semi-savage tribes of Indians, inhabiting such states as Amazonas, Goyaz, and Matto Grosso, not to speak of parts of São Paulo and Paraná, it has been found impossible to give accurate figures.

Alagôas has an area of 35,000 square miles. The population in 1872 was 348,000, now 720,000; Maceio has 36,000, Penedo 18,000, Pilar 16,000, Palmeira 20,000 and Santa Luzia 15,000 inhabitants.

Amazonas—area 1,138,212 square miles. Population (1872) 57,000, (1908) 280,000. The capital (Manáos) 70,000.

Bahia—area 255,855 square miles. Population (1872) 1,379,613, (1908) 1,900,000. Cachoeira has 50,000, Santo Amaro 85,000, Nazareth and Maragogipe about 20,000 each, Valença 25,000. (Joazeiro, Bomfim, Alagoinhas, Santa Anna, Ilhéos, Cannavieiras and Caravellas are other important towns), and Bahia city 200,000.

Ceará—area 62,550 square miles. Population (1872) 721,686, (1908) 850,000. The capital (Fortaleza) 50,000 souls.

Espirito Santo—area 26,901 square miles. Population (1872) 82,137, (1908) 240,000. Victoria 15,000, Itapemerim 20,000.

Goyaz—area 448,431 square miles. Population (1872) 160,395, (1908) 280,000. Goyaz city 14,000.

Maranhão—area 275,931. Population (1872) 360,740, (1908) 540,000. St. Luiz de Maranhão 32,000.

Matto Grosso—area 897,871 square miles. Population (1872) 60,417, (1908) 160,000. Cuyaba 40,000, Corumbá, Matto Grosso, Caceres, etc.

Minas Geraes—area 344,913. Population (1872) 2,102,689, (1908) 4,500,000, Bello Horizonte (capital) 25,000, Ouro Preto 20,000, Juiz de Fôra 30,000. Other cities—St. João d'El-Rey, Barbacena, Queluz, etc., some thousands each.

Pará—area 686,829 square miles. Population (1872) 275,237, (1908) 500,000. Belem do Pará about 120,000.

Parahyba do Norte—area 44,838 square miles. Population (1872) 376,226, (1908) 550,000. Parahyba (capital) 30,000.

Paraná—area 132,792 sq. miles. Population 126,722, (now) 400,000. Curityba 55,000. Paranaguá, Antonina, Morretes, Ponta Grossa, Castro, Guarapuava and Palmeiras are all small towns.

Pernambuco—area 77,037 square miles. Population (1872) 841,539, (1908) 1,400,000. Pernambuco city (Recife) 120,000. There are many cities beside the capital, but all quite small.

Piauhý—area 181,078 square miles. Population (1872) 211,822, (1908) 400,000, Therezinha about 50,000.

Rio Grande do Norte—area 34,491 square miles. Population (1872) 233,976, (1908) 350,000. Natal 18,000, Mossoro 12,000.

Rio Grande do Sul—area 148,933 square miles. Population (1872) 446,962, (1908) 1,400,000. Porto Alegre 90,000, Pelotas 30,000, Rio Grande 25,000, Uruguayana 15,000. Bagé, Livramento, etc., are all small places.

Santa Catharina—area 44,493 square miles. Population (1872) 159,802, (1908) 350,000, Florianopolis (35,000), Blumenau and Joinville are colonial centres of small urban population.

São Paulo—area 174,585 square miles. Population (1872) 837,354, (1908) 2,600,000. São Paulo city (1872) 26,557, (1908) 300,000, Santos 50,000, Amparo 35,000, Piracicaba 40,000, Guaratinguetá 40,000, Taubaté 35,000.

Sergipe—area 23,450 square miles. Population (1872) 234,643, (1908) 380,000. Aracaju (capital) 25,000, Estancia 15,000, Larangeiras 12,000.

The State of Rio has an area of 491,736 square miles, and about 1,350,000 population.

The Federal District of Rio has an area of 669 square miles. The population in 1872 was 274,972, in 1890, 522,651; in 1900 746,749; in 1908 the probable population was 850,000, this is, of course, judging by that given by the census of 1900, although it was considered to be very deficient.

The city itself has about half a million souls, and Nictheroy (Praia Grande) the state capital, some 40,000, Petropolis 25,000, Campos 35,000, Macahé 7,500, Parahyba do Sul 28,000, Rezende 16,000, Vassouras

10,000. Novo Friburgo is also an important place, as also are Cantagallo, Valença and Barra do Pirahy.

The Acre Territory has 114,600 square miles. There is, however, no record as yet of its population.

We thus find Brazil has an area of 5,682,415 square miles, and an approximate population of 20,000,000, of whom 45 per cent. are males. The most remarkable thing in these figures is, undoubtedly, the absolute want of comparison between the sizes of the states and their population. A curious effect of the gold and diamond fever may be also noticed in the disparity between the number of inhabitants in the States of Rio de Janeiro (including the capital of the Republic) and Minas Geraes, in spite of the fact that the latter has no city which may, by any stretch of the imagination, be called a large one. Of course, the ravages caused in the greater part of the former state, up to 1900, by the yellow fever, has a great deal to do with the discrepancy, not so much through the actual mortality, but owing largely to the exodus of the inhabitants. Many parts of the State of Rio have a lesser population now than fifty years ago. With regard to the Constitutional law, which fixes the Capital of the Republic at a selected site in Goyaz, a syndicate offers to build the Government offices and the President's palace, to complete the railways necessary, establish power and light, sewage, trams, and water supply; in short, to create a model city, free, if the surplus lands and concessions for public services be granted to it for a term of 90 years, and that it shall be free of taxes for 20 years.

In the south of Brazil the sexes are pretty well equally divided, but in such states as receive the greater number of immigrants, Rio de Janeiro, São Paulo, Paraná, and

Minas Geraes, the male sex largely predominates. The census will be taken again this year. The present density of population is about 2.40 per square kilometre. The most densely populated state is Rio de Janeiro, and the second is Alagoas, whilst Pará, Amazonas, Goyaz, and Matto Grosso have considerably less than one person to the square kilometre. I have already dealt with the average mortality in the demographic statistics shown under the heading of Climate and Diseases. In all probability the next ten years will show a great alteration in these figures, as the interior states have their communications with the seaboard improved, and without a doubt Goyaz will be one of the divisions of the Republic to profit most.

The first attempt at colonisation, other than by Portuguese, was by John VI., in 1818-19. He started two German villages in Bahia, and a Swiss one at Novo Friburgo (State of Rio). In 1851 the Emperor, Dom Pedro, invited over a number of Germans, and the colony of Blumenau, and that of Joinville, were soon founded, to be shortly followed by that at Petropolis. In 1859 the Prussian Government passed a law prohibiting emigration of its subjects to Brazil, followed long after by the French, and later, by the Italian restrictive measures. It cannot be wondered at that emigration has fallen off since 1891, the year which reached the high-water mark.

In 1867 a large number of Americans from the southern states reached Brazil, and were settled in Paraná, São Paulo, Minas, Rio, Espirito Santo, etc., and about the same time the British immigration was not inconsiderable.

The grand total of 1891 was 275,808, of whom more than 116,000 were Italians. This influx was doubtless due in part to the crisis in the Argentine Republic (1890-92), as at no period since have the arrivals totalled half that

number in one year. Since 1895 the figures have demonstrated the necessity of measures for encouraging the flow of colonists into the country, and the first of the states to show the way was São Paulo. In 1896, 1899 and 1907, the State of Minas Geraes created laws dealing with this problem, and Paraná, Bahia, Matto Grosso, etc., followed suit. On the 19th of April, 1907, the Federal Government issued a national decree regarding immigration and colonisation, the text of the principal articles of which is herewith appended. The *raison d'être* of this decree lies in the position of irresponsibility of the several states before the Federal Government, and, in consequence, as regards propaganda in Europe. This has been the cause of the obnoxious laws passed by most of the European Governments, as regards Brazil, and the most important result, of an immediate nature, achieved by the new Government department is the practical revoking of these measures.

The project, establishing a commission in Europe, was vigorously attacked by a certain section of the Brazilian press, but, as a matter of fact, the propaganda has amply justified itself. The fact that from many parts of the United States repeated requests for concessions are coming in, shows that the conditions of life in Brazil are not such as certain Europeans imagine. A society, numbering 1,600, desires to come all the way from San Francisco, California, to São Paulo, and the great interest taken in Brazil generally in the United States shows that the shrewd farmers of that vast Republic know a good thing when they see it. The Japanese societies of emigration have also succeeded in inducing some 5,000 Nipponese to leave their native land. 787 arrived at Santos on June 18th, last year (1908), and to crown all, came in a Japanese steamer, the "Kasato

Maru," which made the passage from Yokohama in less than six weeks. It is, however, doubtful whether the introduction of these Coolies will prove an unmixed blessing, and the yellow press is now engaged in warning the nation of the "Asiatic Peril," as the German question is by this time, and deservedly so, a thing of the past. Referring to the Teutonic colonies in Santa Catharina and Rio Grande do Sul, it is a curious fact that coloured servants are often obliged to learn German, instead of the alien learning the language of the country. Some towns are entirely Teuton: mayor, councillors, police, national guards, etc., but they are none the less good Brazilian citizens, and would prove good soldiers in defence of their adopted Faderland. The fact of their adhering to their own language, and to their old forms of Sangerbunds and Vereins, is an instance of their strength rather than their weakness. The Englishmen who have lost their mother tongue (as many have in Brazil) are less virile than those who retain their idiom as well as their national attributes.

Figures just to hand give the immigration in 1908 as 94,695, a very large increase on 1907.

Of these there were 10,465 families, and 51,341 travelling alone, and the quality of the immigrants is said by the Director of Colonisation in his report for last year, to be much improved. With regard to the arrangements for the reception and dispersal of colonists, I have received the highest possible praise from Englishmen who have passed through the hands of the officials of the department. In 1908 there were in preparation and course of settlement no fewer than 26 colonies.

These are collocated as follows:—

In Espirito Santo	...	1	In Santa Catharina	...	1
Rio de Janeiro	...	2	Rio Grande do Sul...	...	2
São Paulo	...	9	Minas Geraes	...	5
Paraná	...	6			

Of these the most interesting is undoubtedly that of Itatiaia, consisting of seven estates, having a total area of 48,000 hectares, in two municipalities and in reality two states, as part of the colony is in Minas Geraes. The cost to the Federal Government amounted to £25,000, apart from any preparation or other outlay. The altitude of the district selected ranges from 2,000 to 8,000 *ft.* above sea level, in reality extending to the most elevated regions of Brazil, and, choosing only the most suitable lands, it is proposed to settle there some five hundred families. The Central Railway (São Paulo branch) runs by the foot of the range, and has a station at Rezende. The former proprietor has undertaken to sell to the first comers lots of 20 hectares (or about 50 acres) at £1 5s. per hectare. Payments may be spread over five years without interest.

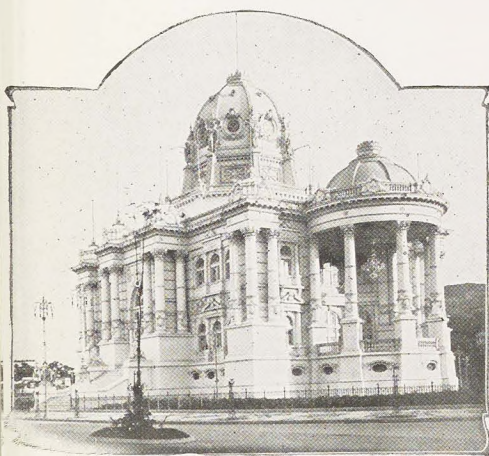
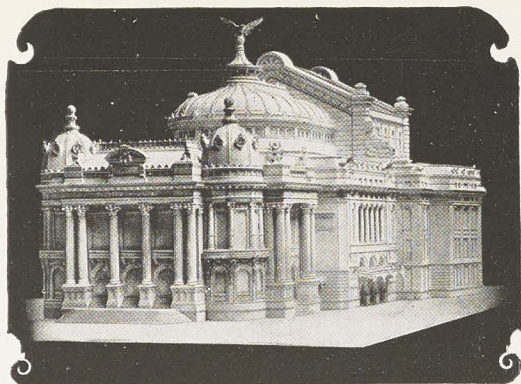
The temperature of the locality varies according to the altitude, the maximum summer heat being 86° Fahr., and the lowest in winter 25° Fahr., or seven degrees of frost.

To those who have been misled by malicious and interested persons, I would say, get hold of the books in English, mentioned at the end of this work, and digest them carefully. Hear what Professor Wallace says, laugh at Captain Burton's quaint criticisms (he was British Consul at Santos) and study Fletcher and Kidder, Scully, Bates, etc. The overwhelming testimony of the greatest and best scientists, business men, and ordinary travellers, during the last 50 years, is that Brazil is a country *eminently* fitted for the European. Read, mark, learn, and inwardly digest, and then treat with the contemptuous scorn it merits, any attempt to discredit a country that, but for the short-sightedness of the British in the days of the conquistadors, would have been now the brightest ornament in the constellation of colonies.

Again, he who is afraid of the security of his earnings need have no care. His wages are the very first call on an estate. If he hires himself out through the medium of the Government, the latter will see that the contract is entirely in order, and enforce its provisions. I speak, however, more to the man who will plough his own furrow, he who wishes a stake in the country, and I say with St. Hilaire, if ever there is a place that could do without the rest of the world, it is Minas Geraes, and I go further, and add to Minas at least one half of the *whole* of Brazil, from the Amazon to the Paraná. There is room for all, and the only condition necessary is ability to work, and the leading of moral lives. There are no religious disabilities of any kind, and one may find members of almost any faith, scattered over the Republic, including Mahommedans, Jews, Evangelicals, Positivists, as well as the majority, who are Roman Catholics. There are, as we have stated in another place, Methodist churches in plenty, especially in the State of Minas Geraes.

Surveys have been made by the engineers of the new department of colonisation, in all of the states which have responded to the appeal of the Federal Government, and this year will, without a doubt, show remarkable activity, and a great increase in the number of immigrants. Bahia has also established a department of colonisation, and issued literature in various European languages. The only state to offer free rural lots at present is Matto Grosso, but the cost of land in all the others is quite low, and payments are spread over a number of years. The special inducements offered also quite justify a normal price for the lots, as they are surveyed and selected by the Government, and the colonists are transported thither at the expense of the department.

THE MUNICIPAL
THEATRE,
Rio de Janeiro
Cost over
£1,000,000.



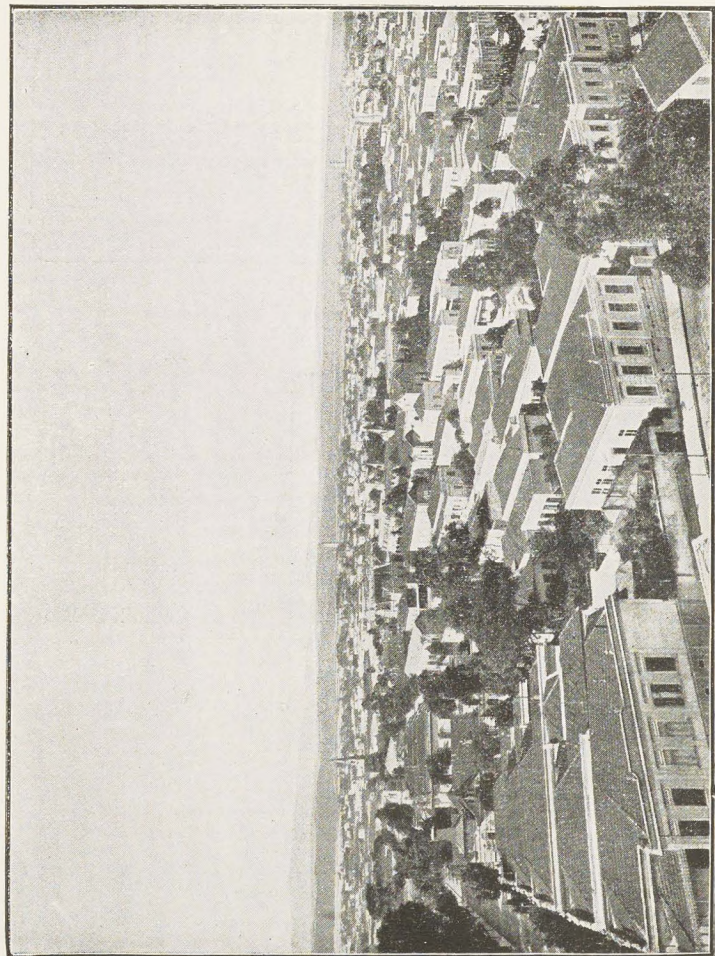
THE MUNROE
PALACE.

Was Brazilian
Pavilion at
St. Louis
Exhibition.

Re-built in Rio
in six weeks.

THE MUNROE
PALACE AND
BOTAFOGO BAY,
Rio de Janeiro.





SÃO PAULO CITY (FROM SANTA CECILIA).

Extracts from FEDERAL DECREE, No. 6,455,

April 19th, 1907.

REGULATIONS REGARDING IMMIGRATION AND
COLONISATION IN BRAZIL.

Art. I. The peopling of the soil will be promoted by the Union in agreement with the State Governments, railway and river navigation companies, other companies or associations, and with private individuals, provided that the sureties and rules hereby guaranteed and laid down are duly observed.

Art. II. There shall be counted as immigrants, all foreigners of less than 60 years of age, who are not suffering from contagious diseases, nor plying illicit trades, and who are not criminals, rogues, beggars, vagabonds, lunatics, or invalids, who arrive at Brazilian ports, travelling third class. Persons over 60 years of age, or unfitted for work, will only be admitted when accompanied by their families, or when coming to join them, provided that there is in the family at least one or two against the member who is over 60 years of age.

Art. III. To immigrants who establish themselves in any part of the country, and devote themselves to any branch of agriculture, industry or trade, or to any useful craft or profession, the following guarantees will be granted: complete liberty of action and freedom to engage in any trade, provided that the same does not endanger public safety, health or morals; complete liberty of religious belief; and finally, civic rights, as enjoyed under the Constitution and laws by Brazilians themselves.

Art. IV. The Union, without interfering with the liberty of similar action on the part of the states, will enter into an accord with them to direct and facilitate the placing the immigrants who desire to settle as owners of their own land, and will protect and advise such spontaneous immigrants as need material aid for their first instalment.

Art. V. The colonies shall be of sufficient extent to admit of development, easy and convenient means of transport, on land chosen as fertile, where conditions are healthy, and there is abundance of drinking water.

Art. VII.

(5) The State will provide the immigrants with tools and seeds free of charge, on first being installed, whilst the Union (Federal Government) may grant them these, and other favours for the same.

Art. VIII. The State may give any assistance to the immigrants, independent of that given by the Union.

Art. XIII. Localities will be chosen which conform to the conditions in Art. V., as well as the following :

(1) Convenient altitude and soil fitted for all kinds of cultivation.

(2) A position on or near railways, or navigable rivers, or close to populous centres, where the holders of the lots will find a ready market.

(3) A constant and ample supply of water, both for domestic and drinking purposes, and for agricultural and industrial purposes.

(4) Topographical configuration, and other conditions permitting the use of agricultural machinery.

(5) Forests which will afford a sure and cheap supply of timber for building and other works.

(6) A large enough area to permit of the increase of the nucleus, so that relatives or descendants of the first immigrants may be invited to come and form new households, and hold lots in the same vicinity.

Art. XIV. When the locality has been chosen, the lots will be marked, and all necessary work put in hand, and the place prepared for occupation by the colonists.

Art. XVIII. If the position and importance of the nucleus demand the establishment of headquarters, a site will be reserved, and the necessary buildings erected.

Art. XIX. In each nucleus, ground will be set apart for the erection of schools, and for experiments in agriculture, for instruction farms, and for industrial purposes.

Art. XX. The lots will be classified as rural and urban.

(1) Rural lots will be devoted to agriculture and cattle breeding, and will be of sufficient extent for the colonists who own them.

(2) As a general rule, rural lots will not exceed 25 hectares (about 62 acres), when situated along or near a railway, or river navigated by steamers, but otherwise they may be up to 50 hectares.

(3) Urban lots will be those situated at the headquarters, and will ultimately form the township, and all their fronts will be on streets and squares.

(4) No urban lot may exceed 3,000 square meters, unless set apart for some special purpose.

Art. XXI. As a general rule, a good and sanitary house will be built on each urban lot to be occupied by the immigrant and his family, whilst the ground will be prepared for the first cultivation, to be made by the person who acquires it.

(1) Immigrants who desire to erect houses at their own expense and according to their own taste, will have lots without houses reserved for them.

(2) Under the conditions of the preceding, the immigrant and his family, who acquire the lot, will be afforded temporary quarters, until they have built the house, which must be within the space of one year.

Art. XXII. Rural lots will be sold either for cash or for payments in instalments. In the former case, a definite title will be handed over immediately, and in the latter, a provisional title, which will be substituted by a definite one, as soon as all payments have been made.

(1) Anyone purchasing a lot on the instalment system, may pay off the debt in full, or in part, before the due date, at any time, in order to shorten the period for receiving the definite title.

(2) Under the conditions of the preceding paragraph, the purchaser will enjoy the privileges of paragraph 2, Art. XL.

Art. XXIII. Urban lots will only be sold for cash.

Art. XXIV. Lots will be sold at a moderate price, which shall be previously fixed, according to their size and position.

Art. XXV. Where there is a house on the lot, the cost price of the same will be added to the debit.

Art. XXVII. *Immigrants not accompanied by their families may only purchase rural lots for cash.*

Art. XXVIII. Immigrants accompanied by their families may acquire a new lot after obtaining a definite title to the first. When the family consists of more than five workers, or when the immigrant has improved the first lot, he will be allowed the preference for the purchase of a second, near the first.

Art. XXIX. The foreign immigrant (agriculturalist) who has been less than two years in Brazil, who marries a Brazilian woman, or the daughter of a Brazilian born in the country, or the Brazilian who marries an alien woman, who has been in the country less than two years as an immigrant, will be given a lot with a provisional title, without the couple having to pay anything, provided that they have lived in harmony for a year, and have improved the said lot.

Art. XXX. If such immigrant desires to obtain a lot with a definite title immediately after his marriage, the same will be sold to him for half the stipulated price.

Art. XXXI. On the provisional title shall be written the full price of the lot, and the conditions to be observed for the obtaining of a definite title.

Art. XXXIV. Immigrants will be transported to the colonial nucleus free of charge.

Art. XXXV. Immigrants will be given (free of charge at first) seeds, hoes, spades, picks, axes, and scythes.

Art. XXXVI. During the first six months, from the date of their arrival at the nucleus, and until the harvest and sale of their produce, immigrants coming from abroad, and settled as owners of lots shall, when necessary be granted means for the maintenance of their families.

Art. XXXVII. For the space of one year, under the conditions of the preceding article, all immigrants will receive medical attendance and medicines free of charge. This period may be prolonged at the discretion of the administrator of the nucleus.

Art. XXXVIII. Stores, where provisions and other articles of prime necessity will be sold at moderate prices, will be established in the colonies, to guarantee supplies

to the inhabitants, who, however, will be entirely free to purchase where they like.

Art. XXXIX. During the first year after his instalment (or for a longer period if the Government so decrees) aid may be given to such immigrants as desire it, for the purchase, or hiring, of agricultural implements and machinery, live stock and vehicles necessary for the cultivation of the lots, and the preparation and transport of the produce.

Art. XL. The price of the lots, with or without a house, when the same are purchased on the instalment system, as well as any aid granted, except for work done, or classed as gratuitous, shall be written in a book and handed to the debtor, in the form of a current account, and shall constitute the debt of the immigrant, for which the head of the family is responsible. He shall begin amortisation by yearly instalments, not later than at the end of the second year after his establishment. After this date, if no payment has been made, interest will be charged at the rate of three per cent. per annum, on the instalments due.

(1) When the colony is situated on or near railways, or rivers navigated by steamers, the period for amortisation shall be five years, counting from the first day of the third year of the instalment of the immigrant. In other cases, or when the Government deems it advisable, the period will be eight years, under the same conditions.

(2) The immigrant who pays his debt in advance will have a right to rebate at the rate of twelve per cent. per annum, on instalments that are outstanding.

(3) The immigrant who pays the full value of the lot, will immediately receive a definite title to the

same, even though he has still other debts outstanding, contracted with the administration of the nucleus.

Art. XLI. In the event of the decease of the head of the family, in whose name the provisional or definite title had been drawn up, the lot will pass to his heirs, or legal representatives, on the same conditions on which he himself held it.

If the nucleus has not yet been emancipated, the transfer will be made by an official order of the administration without any legal intervention.

Art. XLII. Any debt which the deceased head of the family had contracted with the nucleus, will be considered extinct, if he leaves a widow and orphans, save that arising from the purchase of the lot on the instalment system.

Art. XLIII. If the lot was purchased by instalments, and three had been already paid by the deceased, the remainder will be remitted in favour of the widow and (or) orphans, and a definite title granted.

Art. XLIV. Government will maintain primary schools free, and will organise agricultural shows if deemed expedient.

Art. XLV. Prizes will be offered to producers who most distinguish themselves at such exhibitions.

Art. XLVI. Where the nucleus is intended for aliens not more than 10 per cent. of the lots may be sold to Brazilians, but where the former exceed a certain number, a special area near the lots will be set aside for Brazilians if deemed advisable.

COLONIES DUE TO THE ENTERPRISE OF RAILWAY
COMPANIES.

Art. LXIII. The choice of the localities will depend on careful study of all the circumstances essential to the development of the colony.

Art. LXIV. The choice must be examined and approved by the Federal Government.

Art. LXV. In addition to the foregoing, the plans, roads, divisions of lots, types of houses, etc., must be approved by the Government.

Art. LXX. The Government may authorise, or promote at its own expense, the introduction of immigrants from Europe to these colonies.

Art. LXXI. The service of settling the immigrants shall be at the expense of the company, which shall furnish the new comers with tools and seeds, and when possible, give them paid work on the railway or near the lots, and shall supply them, whenever necessary, with advances of food or money until harvest time.

Art. LXXIII. The price of lots, and houses, and conditions of payment depends on the approval of the Government, which reserves to itself the right to fiscalise anything in the colonists' interests.

Art. LXXIV. The company binds itself to grant a rebate of 50 per cent. on the ordinary tariffs on colonial produce for five years, dating from the instalment of the first family on a lot.

Art. LXXV. The company will render every aid in its power, and will stimulate the formation and increase of small industries. It will create free primary schools, and build churches for the immigrants, regardless of denomination.

Reception of Immigrants.**Art. XCVII.**

(2) At ports properly equipped for the reception of immigrants, disembarkation, lodging, food, etc., until the destination is chosen, and transport there with all belongings; and transport will be gratuitous.

Art. C. Immigrants' baggage, including tools, will be admitted duty free.

Art. CXVII. The service of reception and distribution of immigrants will be carried out at the expense of the Union at the port of Rio Janeiro.

Art. CXVIII. In State ports (as Bahia, Santos, etc.) the service will be at the expense of the State interested, aided by mutual arrangement, by the Union.

REPATRIATION.

CXXVII. Government will repatriate such agricultural immigrants who may have been brought in at their own expense, if they have resided less than two years in Brazil, and are incapacitated from earning their living, and have none of their family to support them.

**Regulations of the State of São Paulo,
27th December, 1906.**

Every immigrant intending to settle in the state, and who gives notice to the official of the department before leaving the ship at Santos, will be conveyed, with his luggage and other belongings, free of charge, to S. Paulo. The families of such immigrant are received into the home at S. Paulo, and the head of the family is franked as far as the colony he intends to settle in, and back

again to S. Paulo. On arrival at the lot selected the colonists are sustained there for 15 days, and receive tools, and seeds necessary for the first crops, without any charge.

Of the colonies under Government protection, it may be said that they are situated along the railway lines. The annual payments vary from £6 5s. to £18 15s. Recent arrivals, without resources, are given three days' work weekly if required, in order to maintain themselves and their families until the harvest is in.

Immigrants are considered to be persons under 60 years of age, either in families or single men, who, as agriculturists, enter the country with the intention of remaining, and come third class or steerage from Europe. In the case of those over 60, they must be accompanied by a family of two or more male adults, in order that their support may be assured. The price of land ranges from 5/- to 35/- per acre, according to its quality and situation. Free schools are established in each colony, and there are always physicians and ministers of religion at hand. Family lists (to be procured from any of the Government agents) should be filled in and returned before sailing.

The Leopoldina Railway has deposited in the Federal treasury the sum of £125,000 for the purpose of colonisation in the zone served by its lines, principally for centres (*neucilii*) in the State of Minas Geraes. Written application to this company, both at the Rio headquarters and at the London office, has resulted in very little information being obtainable, except that two colonies will be established at first, in the nature of model farms. I cannot gather that this (British) company has any idea of allotting any of the territory thus set on one side for the benefit of English colonists.

The influx of settlers was so great during 1908 that only in very exceptional cases will the Federal Government now grant free passages. It is the policy of the state at present not to use any means of inducing emigration from the United Kingdom to Brazil in accordance with the strongly expressed views of the British Government on this subject. The President of the Republic has asked Congress to facilitate the settlement of the country, by granting land free to colonists who have cultivated it satisfactorily for two years.

São Paulo.

During the year 1908 the São Paulo Government found situations for 26,540 immigrants, as compared with 18,661 in 1907. 18,716 persons were sent to the coffee plantations, and 4,717 for railway construction, and to mills and factories 2,206.

In the above state a family of six persons, five of whom (aged from 12 to 45) are able to work, should earn as follows:—

Excess of production of live stock	£30	0	0
Coffee harvesting (per head, £16) -	80	0	0
Daily labour on estate, £6 - -	30	0	0
Net minimum savings - -	<u>£140</u>	<u>0</u>	<u>0</u>

The above estimate relates to a family of agricultural workers of average capacity and behaviour, and does not apply either to quite inexperienced persons, nor yet to good or bad years.

CHAPTER VI.

Naturalisation, Constitutional and Commercial Laws, and Education.

SYNOPSIS OF NATURALISATION LAW OF MAY 14TH, 1908.

Art. I. The following persons are considered to be Brazilian citizens :—

(1) Those who are born in Brazil, although the father be a foreigner, provided he is not employed in the service of the nation to which he belongs.

(2) The children of Brazilian fathers, and illegitimate children of Brazilian mothers, born in foreign countries, if domiciled in Brazil.

(3) The children of Brazilian fathers employed in the service of the Republic in foreign countries, although not domiciled in Brazil.

(4) Foreigners who resided in Brazil on the 15th of November, 1889, and who had not up to August 24th, 1891, declared their intention of retaining their original nationality.

(5) Foreigners owning real estate in Brazil, married to Brazilian women, or having Brazilian issue, provided they are resident in Brazil, and have not declared their intention to adhere to their original nationality.

(6) Foreigners who apply for naturalisation under the present law.

Art. II. Naturalised foreigners shall enjoy all civil and political rights, and may hold *any* public office, except that of President or Vice-President of the Republic. The office of Senator may be held after six years citizenship, and that of Deputy after four years.

Art. IV. Foreigners who desire Brazilian citizenship must apply to the President of the Republic, through the Ministry of Justice. Applications must be signed and authenticated by a notary public, and must state nationality, parentage, domicile, profession, condition, and legitimate issue must also be mentioned.

Applications must be accompanied by certificate of personal identity, legal age, residence of not less than two years in Brazil, good moral and civil conduct, and proof that applicants have not been indicted in Brazil or elsewhere for the offences enumerated in Art. IX.

Art. V. Necessity of actual residence shall not be obligatory in the cases of foreigners married to Brazilian women, those with real estate in Brazil, those interested in some industrial undertaking, or who are inventors or introducers of some industry useful to the country, and those recommended by their talents or literary attainments, or by their professional skill, and finally, sons of naturalised foreigners born abroad before their father's naturalisation.

Art. VI. Certificates from public departments, or given by judicial, municipal, or police authorities of Brazil are sufficient proof of identity. Certification of signatures by notaries, or in case of application through the latter, power of attorney is sufficient, and birth or

baptism certificates, or passports, or other admitted documents, will be proof of legal majority, and certificates from the authorities of his place of domicile, from his consul or diplomatic representative will be accepted as proof that he has not been convicted of the crimes mentioned in Art. IX.

Art. VIII. *Papers relating to naturalisation are exempt from all costs, stamps or fees.*

Art. IX. Foreigners who have been convicted of homicide, theft, bankruptcy, perjury, smuggling, forgery, counterfeiting, or immorality will not be permitted to naturalise.

Art. XVI. The titles of naturalisation must be claimed within six months by persons living in the Federal Capital.

Art. XVII. Persons residing in the states must claim their titles within one year.

NOTES ON THE CONSTITUTION (24TH FEBRUARY, 1891),
AND FORM OF GOVERNMENT OF BRAZIL.

The Republic consists of the United States of Brazil, and the internal affairs of each state may not be interfered with by the Union, unless to repel foreign invasion, or in the case of civil war between two states, or to re-establish order within the territory of any state, by request of its authorities.

Each state must provide for its own necessities, unless in the case of public calamity. It is the exclusive prerogative of the Union to decree duties and taxes on imports and port dues, stamp duties, and postal and telegraph charges, to maintain banks, and create custom houses, and the laws of the Union shall be executed by

its officials, but they may be entrusted to State Government by consent. Interstate duties are prohibited, but states may create export duties, taxes on real estate, and charges of a state nature in relation to postal and telegraph services.

Interference with, or aid of religion, is prohibited. Coasting traffic must be carried on in national bottoms (i.e., under the Brazilian flag).

Legislative powers are vested in the National Congress, with the sanction of the President. The elections for Senators shall be carried out simultaneously throughout the country. Legislature shall last for three years. There shall not be less than four Deputies for each state. The Senate shall be composed of citizens over 35 years of age, and include three from each state, and three for the Federal District of Rio de Janeiro.

The President and Vice-President of the Republic shall be elected by direct suffrage of the nation, and the mandate of a Senator shall last for nine years. The Senate alone shall have the power to try and sentence the President of the Republic, and the other members of the Government. The President must be a Brazilian born, and be over 35 years of age. He may choose and dismiss at will all Cabinet Ministers, and declare peace and make war.

Adult suffrage is the law, with certain exceptions. The Cabinet consists of the Ministers of the Exterior (foreign affairs), Interior and Justice, Finance, Marine, War, and Industry, Railways, and Public Works, and since 1907, Agriculture.

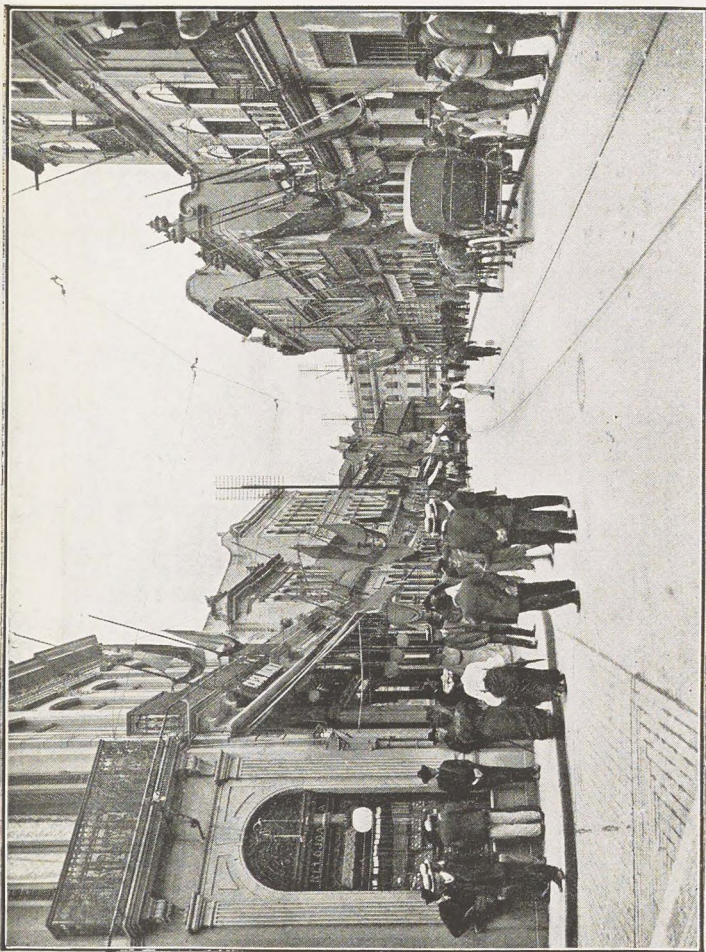
The judicial power consists of a supreme court of 15 justices, who hold office during life, and ordinary Federal Courts scattered through the country.

Brazil forms part of the Postal Union, and is a party to the international agreements with regard to telegraphs, submarine cables, marine signals, and protection of industrial property.

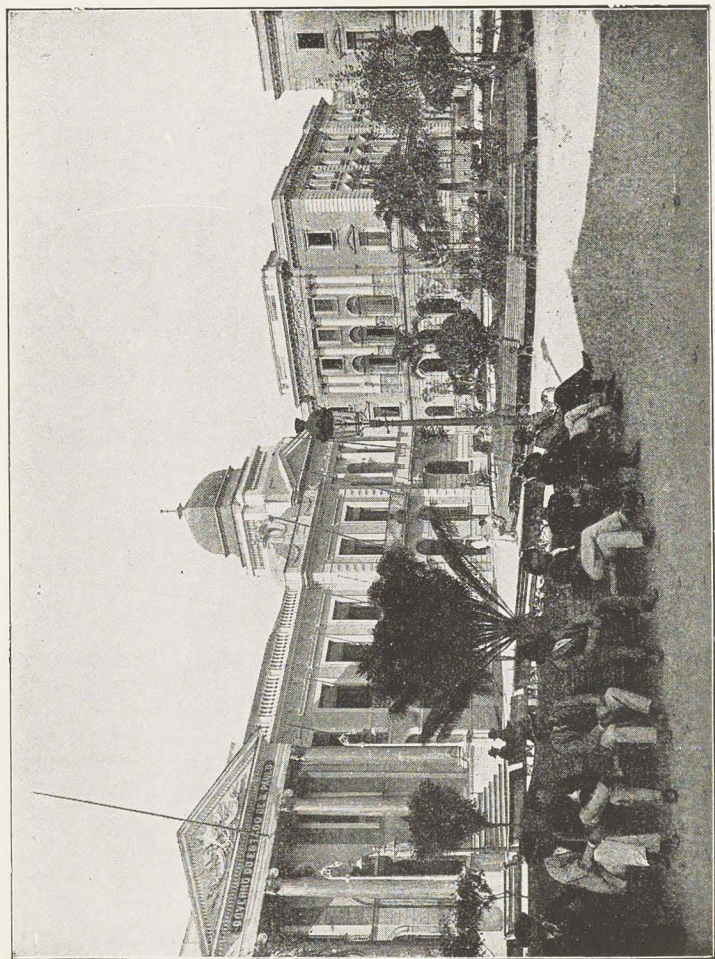
Foreigners enjoy the same civil rights as Brazilians, including trade marks and patents privileges. The army consisted of 40 battalions of infantry, 6 of siege artillery, 6 regiments of field artillery, and 14 regiments of cavalry, but since 1902 has been re-organised and increased. Conscription has also been adopted. No aliens are admitted into the army or navy. The navy has been entirely reformed, and will be quite the most powerful of the South American marines. Ninth, and perhaps eighth place in the world's navies will be reached by 1910.

With regard to marriages, the civil ceremony is obligatory, and the religious services are not officially recognised. Both are the rule, however, amongst Brazilians of all classes. The laws for the protection of single women are very severe, and in case of rape every possible attempt is made to compel immediate marriage, thus avoiding heavy punishment. Registration of births is compulsory, but the law is frequently evaded, as is also the new vaccination decree, although schools are obliged to publish a notice refusing to take pupils who have not been subjected to the operation.

Education is free, but not obligatory in all the states. Elementary schools are of two grades. In the first pupils remain from 7 to 13, and in the second until 15 years of age. Besides the ordinary subjects, moral and civil instruction is given, and the elements of French, and elementary algebra and trigonometry, and commercial natural history. Elementary principles of law and



RUA 15 DE NOVENBRO, SÃO PAULO.



PALACE OF THE GOVERNMENT, SÃO PAULO.

political economy are also taught. Secondary schools may be entered with a certificate from the primary ones. The capital has two schools of this class. There are others in all of the states, and faculties of law at Pernambuco and São Paulo, as well as medical schools; the polytechnic at Rio, and the school of fine arts, and the mining school at Ouro Preto. Private colleges, with the necessary equipment and professors, are permitted to grant degrees of doctorate (Bacharel). The course in the schools of law lasts five years, and that of the mining school six years. The medical school at Rio is connected with the splendid Misericordia Hospital, with 1,200 beds. The polytechnics are training colleges for engineers, and bachelors of physical or mathematical science.

There are fine public libraries all over Brazil. The National Library in Rio possesses more than 400,000 printed books and manuscripts. There is also a National Museum, and Academy of Fine Arts, and a splendid world-famous Botanical Gardens. The Brazilian Academy of Letters has 40 members.

In São Paulo there is a very fine modern museum, (Ypiranga) on a site said to commemorate the declaration of independence. There is also there the McKenzie College, under Presbyterian control, with nearly 600 students. The pupils are mostly Brazilians, but there are representatives of nearly all the nationalities to be found in Brazil. The states of São Paulo and of Minas Geraes are probably the best equipped with elementary schools in the Union. The former has also a fine agricultural college.

HOLIDAYS.

	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
National	.. 1	24	..	21	3	..	14	..	7	12	2/15	..
City of Rio	.. 20	..	..	..	..	..	..	..	10	..	..	..
STATES.												
Alagoas ..	..	..	..	..	..	11	..	..	16	..	..	..
Amazonas ..	..	..	..	..	..	10	1	17	5	..	21	..
Ceará ..	..	..	25	..	..	..	12	..	..	..	16/24	..
Espirito Santo	..	..	..	..	2/23	12	..	..	2	..	..	26
Goyaz ..	..	..	..	..	..	1	..	..	..	..	..	16
Maranhão ..	..	..	..	..	..	..	28	..	..	..	18	..
Matto Grosso	.. 22	..	..	..	..	13	..	15	..	..	..	9
Minas Geraes	..	..	..	..	..	15	..	..	..	..	..	..
Pará ..	..	..	..	..	..	22	..	15	..	..	16	..
Parahyba ..	..	..	..	..	..	..	20	5	..	..	..	..
Paraná ..	..	..	..	7	..	..	..	..	..	..	..	19
Pernambuco	.. 27	..	6	..	..	17	24	..	..	..	10	..
Piahy ..	.. 24	..	..	..	..	13	..	..	..	..	16	..
Rio Grande do												
Norte ..	..	..	19	7	..	12	..	..	..	..	..	..
Rio Grande do												
Sul ..	..	..	..	..	..	..	..	20	..	..	..	..
Rio de Janeiro	..	..	..	9	..	..	..	18	..	..	..	..
Santa Catharina	..	..	..	..	..	11	..	..	..	..	17	..
São Paulo ..	.. 25	..	..	..	..	..	8	..	..	..	..	15
Sergipe ..	..	..	..	..	18	..	..	..	..	11/24	..	..
Saints' Days	.. 6	2	25	..	..	24/29	.. 15	8	..	..	1	8/25

Besides the ordinary movable feasts.

LAW SITTINGS.

Criminal Courts open all the year. Civil Courts are closed from 1st February to March 31st, and during Holy Week.

PATENT LAW.

1. The invention must be described fully, and all plans, drawings, samples, etc., etc., be presented in duplicate to the 1st section of the *chief office of the Ministry of Industry.*

2. All details must be in the vernacular (Portuguese) without any corrections or erasures, initialled on each sheet, and signed by the inventor or his representative.

3. Weights and measures must be according to the metrical system.

Temperature by centigrade thermometer, and density according to specific gravity.

4. Plans to be on white paper without folds or joins, and in black indelible ink. Sheets to be 33 centimetres in height by 21, 42 or 63 breadth, enclosed in a single lined frame, with an all-round margin of 2 centimetres.

6. A receipt may be had for the plans (free of charge) if desired.

7. After deposit of plans and specification, petition must be made to the Minister of Industry for a patent. This must be distinct for each invention, and must contain name, nationality, profession and residence of inventor, and the purport of the invention.

8. The petition must contain also a list of the documents, etc., and in case of being presented by an agent, a power of attorney (*procuração*), and the original patent, if it is a case of an invention already protected abroad.

9. The President of the Republic will sign all patents, and then publication of the Presidential despatch will be made in the *Diario Official* and the inventor invited to personally demand the titles, pay the fees and dues, and witness the opening the envelopes containing the documents, on a day and hour fixed within one month.

10. In case of Provisional titles, no duplicates are required. Such a title may be given, up to a period of 3 years, without formalities, but if the invention is worked

industrially during this period, the inventor shall lose the right of priority. Stamp duties on Provisional titles are 5\$500.

11. In case of an invention of a dangerous or dubious nature, or one dealing with food, chemicals or *materia medica*, a *secret examination is made by the Government*.

There are in Rio de Janeiro now several patent agents, and it is better to entrust the conduct of negotiations to one of these.

TRADE MARKS REGULATIONS.

1. Trade marks showing designs of medals, prizes, or diplomas must be authenticated by presentation of said medals, etc., etc.

2. All other signs, arms, blazons, names, etc., must be authorised.

3. Words, signs or pictures offending decency are prohibited.

4. National (Brazilian) arms are not to be used as a trade mark.

5. Registration lasts 15 years, and at the end of that period may be renewed.

TO OBTAIN REGISTRATION.

Three copies of the trade mark must be sent in containing:

1. Description and characteristics.

2. Reproduction, with all accessories, including sample of ink to be used.

3. A declaration of the business for which to be used, and the profession and domicile of the petitioner.

4. The petitioner may declare that said mark may vary as to size, colours and their arrangement.

Petitions and copies of mark must be on strong paper 33 centimetres high and 22 centimetres wide, with a margin for binding, and no folds or joins, all to be stamped, dated, and signed. The secretary of the Commercial Board (Junta Commercial), or the official appointed, shall certify the day and hour of presentation of models, etc., and register same as soon as registration is granted, the secretary of said Junta, or officer of Department of Commercial Inspection, shall certify same on each copy of mark, and cause the petition to be filed together with one of the copies, numbering it, and also the remaining copies which shall be returned to the petitioner. Publication shall be made within 30 days in the *Diario Oficial*, or in the official organ of any state, together with a full description of the trade mark, and as soon as the preliminaries are concluded the *Diario Oficial* shall publish a certificate of registration.

Appeals for annulling registration must be made within 5 days, or in case of non-residence of the appellant 30 days. *As in the case of patents it is advisable to employ a local agent.*

BANKRUPTCY LAW.

This law came into force in December, 1908. It contains 15 chapters, and the principal items are:

In case of debtors offering 60 per cent. of amounts due, any agreement between creditors must be approved by 60 per cent. of the claims. Bankrupts offering 40 per cent., at least two-thirds of the creditors must be in accord and represent 75 per cent. of the debt. If less than 40 per cent. is offered, the composition should be approved by three-fourths of the claimants owning not less than 80 per cent. of debits. No agreement or composition will be considered valid, unless at least 20 per cent. is offered by the debtor.

WEIGHTS AND MEASURES.

The metric aystem is in general use, but some of the old Portuguese measures, etc., are still in use, as:

Weights :	Oitava	...	...	3·586 grammes.
	Onça	...	...	21·961 „
	Libra	...	...	·4595 kilogrammes.
	Arroba	...	...	14·6896 „
	4 arrobas...	...	...	1 quintal.
	13½ quintals	...	...	1 tonelada.

Long Measure :	Pollegada	...	...	·0275 metres
	Palmo	...	...	·22 „
	Pé (foot)	...	...	·33 „
	Jarda (yard)	...	...	·91 „
	Passo (pace)	...	...	1·65 „
	Tolsa (6 pés)	...	...	1·98 „
	Vara	...	...	1·1110 „
	Braça (10 palmos)...	...	...	2·2219 „
	Estadio	...	...	262·7484 „
	Milha	...	...	1,955·3127 „
	Legua (geographical)	...	...	5,555·5 „
	„ (kilometrical)	...	...	6 kilometres.

Land Measure :	Braça quadrada (square)	...	...	·0484 acres.
	Prato de tierra	...	...	10·89 „
	Geira (400 braças)...	...	...	19·36 „
	Quarta de tierra	...	...	37·12 „
	Alqueire (S. Paulo)	...	...	174·24 „
	„ (Rio)	...	...	348·48 „

Cubic Measure :	1 braça cubica	...	...	10·648 cubic metres.
	1 palmo cubica	...	...	·9106 „

Liquid Measure: Tonel, 2 pipas (pipes) 958·32 litres.

Pipa (15 almudes)...	479·16	„
„ (commercial)...	480	„
Almude (12 medidas)	31·944	„
Medida (4 garrafas)	... 2·662	„
Garraffa (bottle) ...	... ·666	„

Dry Measure: Alqueire (Bahia) ... 36·27 litres.

„ (Rio)	... 39·9970	„
Quarta ...	... 9·07	„
Canáda (Rio) ...	... 2·7715	„
Selamin ...	... 2·27	„
Sacca (sack) 3 alqueires	... 109	kilos.
„ „ 2 alqueires	... 73	„
„ „ sugar	... 50	„
„ „ „ (Pernambuco)		
for Rio, Santos & Paraná	60	„
for other ports & export	75	„
„ coffee ...	... 60	„
1 barrica (barrel) sugar	... 105	„
$\frac{1}{2}$ „ „ „	... 88	„
$\frac{1}{4}$ „ „ „	... 58	„
$\frac{1}{8}$ „ „ „	... 38	„
$\frac{1}{3}$ „ „ „ (refined)	52	„
1 barrica flour ...	... 88·95	„
1 sacca „ ...	... 88·95	„
1 barrica cement (net)	... 50	„
1 sacca cotton ...	... 80	„
1 bale cotton ...	... 180	„

COINAGE, ETC.

Unit ... 1 real (plural reis).

Bronze, 20, 40, reis (100 reis = $1\frac{1}{2}$ d. and a fraction over).Nickel, 100, 200, 400 reis ... (400 reis = $6\frac{1}{16}$ d.)

Silver, 500, 1,000, 2,000 reis.

1,000 reis is expressed 1\$000, and is called 1 milreis = $1/3\frac{1}{4}$.

Paper, 500 reis, 1 and 2 milreis (being withdrawn), 5, 10, 20, 50, 100, 200, 500 milreis.

1,000\$000 is called a conto of reis, worth actually £63 10s., thus £1 is worth almost 15\$700.

MOVEMENT OF CURRENCY.

MILREIS.

1900	.....	$9\frac{23}{64}$	pence.	1906	.....	$16\frac{1}{32}$	pence.
1901	.....	$11\frac{17}{64}$	„	1907	.....	$15\frac{5}{64}$	„
1902	.....	$11\frac{53}{64}$	„	1908	.....	$15\frac{8}{64}$	„
1903	.....	$11\frac{61}{64}$	„	1909	.....	$15\frac{10}{64}$	„
1904	.....	$12\frac{8}{64}$	„	1910 (Jan.)	.....	$15\frac{16}{64}$	„
1905	.....	$15\frac{50}{64}$	„				

LAW RELATING TO COMMERCIAL TRAVELLERS.

Commercial agents are not required to take out any special license, or to have passports or certificates, but owing to the new regulation providing for deportation of undesirable aliens, it is advisable for such travellers to register. Without this precaution they cannot bring a suit to enforce payment of a debt, and persons buying off an unregistered agent can refuse to pay for the goods, if they choose. Most firms who send out representatives, establish relations with some local house, and the collections are taken over by the latter. In this way it may be possible to avoid paying taxes in the larger cities. Some states require a license. The states and municipalities have the power to fix fees, which are apt to change. Samples are subject to duty, and the latter is not refunded, but such samples are not liable to a special duty of 10 per cent. (vide No. 560 of Customs Regulation). All merchandise must be accompanied by a consular invoice, except in case of small samples, not

exceeding £10 in value. A rebate has been granted of 25 per cent. on the tickets of commercial travellers on the Central Railroad, on production of a voucher from the Commercial Association of Rio, that the bearer is a bona-fide commercial traveller. Agents' trunks must pay duty, but it is intended to remedy that abuse, as also the taxes on samples in each port. In the future a certificate of charges will be obtained from the first custom house entered.

FOOD LAWS OF BRAZIL.

Article 40, Law 428 (December 10th, 1896), prescribes as follows:

Wines, lard, and all other food substances condemned by the National Laboratory shall be destroyed, and the importers fined 500\$000, £31 5s. od.

There shall be condemned as injurious to health, *all* food products containing boric or salicylic acid, inferior alcohol, free mineral acids (sulphuric, sulphurous, azotic, chlorohydric), sulphite, alum fluorates, and alkaline fluosilicates, saccharine, compounds of strontium, and other minerals in the proportion of 15·4324 grains (2 grams) per litre (or 1·0567 quarts) of wine. Hop substitutes in beer, as quassia, absinthe, aloes, etc. Also any essentials prepared with ethereal oils, colouring matter prepared from coal tar, and of a lead base; mercury, copper, arsenic, antimony, or *any other substance* which science has recognised as injurious to health. The importation of artificial wines is prohibited under *all* circumstances. Wines with more than 20 per cent. of alcohol may have four grams of sulphate of potassium per litre.

In 1898 and 1905, additions were made to the list of prohibitions, including adulteration, purposely so made,

of wines and spirits, and also naturally generated noxious properties, *due to chemical re-action on hops in transit, etc.*

Immense quantities of beverages of *all kinds* have been condemned, owing to their containing salicylic acid, excess of sulphates, colouring matters (aniline), and free sulphurous acid.

Among other products destroyed, have been meats (*particularly hams*), preserved vegetables, sweets, and fruit preserves, butter (containing boric acid).

Analysis (fee 25/-) is obligatory of every kind of food or beverage sold within the country. The fee is liable to be increased, in case of extraordinary circumstances.

SUBSIDIES, ETC.

Congress is asked (1908) to grant an annual subsidy to individuals or syndicates who may put into wheat cultivation at least 200 hectares (or 500 acres) of land for five years. This subsidy is 15 contos, equals £937 10s.

The President of the Republic is authorised to grant a subsidy, at the rate of £250 per kilometer (0.62 mile), to companies or private individuals building roads, and organising automobile services for passengers or goods between two states, or across one only. The roads shall be made in accordance with Government regulations, and the subsidy shall be paid when 120 kilometres have been completed, inspected, and approved.

A bill has been introduced in Congress, to grant four per cent. interest to the first five iron works employing national materials, to be increased to six per cent., if Brazilian coal or other combustible is used. In connection with this it must be noticed that very encouraging experiments have been carried on by Dr. Arthur Barbosa, with an electric furnace at Ouro Preto. The expenses of

installation (amounting to £4,370) were authorised by the late Minister of Industry.

Subsidies have also been granted by the State of Rio Janeiro to a firm commencing the manufacture of paper from the piri-piri (papyrus) a reed growing all over the swampy lands at the edge of the Bay of Rio (north and west), also to producers of silk, cotton, etc.

A bill has been introduced to exempt from payment of taxes all machinery, etc., for rubber factories within the next three years, also to grant a premium of 50 contos (£3,120) to anyone inventing an economical process for curing rubber.

FLOUR MILLING.

The Legislature of the State of Rio de Janeiro has passed an act granting—to the first company establishing a flour mill—exemption from taxes on exporting wheat-flour *for ten years*, and a free concession of public lands for wheat cultivation.

Free entry for all machinery will be asked from the Federal Government.

SILK CULTURE.

The Minister of Agriculture has credited to him the sum of 100,000 francs to offer as prizes for silk culture. For each kilogramme of cocoons, 1 milreis; 5,000\$000 (5 contos) for each plantation of 2,000 mulberry trees, and 45 contos between the two first silk factories using natural silk and equipped with modern machinery.

WHEAT CULTIVATION.

A decree dated December 31st, 1908, authorises an annual bounty of £94 5s. to agricultural societies cultivating wheat. The bounty is offered for five years,

and will be paid quarterly. The syndicate must be organised under Brazilian law, and must cultivate at least 500 acres under the direction of an expert. A bounty of equal amount is offered for the erection of flour mills having a *capacity of not less than 11,356 bushels*.

EXPERIMENTAL STATIONS.

To five or more syndicates combining to establish laboratories and experimental stations for the study of agricultural chemistry, etc., a bounty is offered of £1,250.

CHAPTER VII.

Finance and Commercial Notes.

THE postal rates from Brazil to England are now reduced in accordance with the Postal Convention of 1907, i.e., 200 reis ($3\frac{1}{2}$ d.) per 30 grammes. At present there is no stamp in use in Brazil of the value of $2\frac{1}{2}$ d., so the tax works out at a little more than the International rates. The old tax was 300 reis for 15 grammes, or about $\frac{1}{2}$ oz.

BRUSSELS INTERNATIONAL EXHIBITION, 1910.

The Federal Government has decided to build a pavilion, and has allotted the sum of £31,500 for representation.

SHIPPING GOODS.

Weight of both goods and cases (or other covering) should be given separately. Catalogues should be accompanied (whenever possible) by fair samples.

No tenders can be accepted from any European or other firm not having an agent in the Republic, and not being officially authorised to do business in Brazil.

In the future the only vessels permitted privileges of mail boats will be those fitted with refrigerators suitable for fruit carrying.

No new railways will be given concessions, and no old ones renewed, unless the companies possess and employ cold storage waggons.

In order to do business successfully in Brazil, several things are necessary. First, the goods sold must be of a high grade, and before exporting, a visit should, if possible, be made to the country, or the consular reports (both British and North American) carefully studied. Catalogues *must* be in Portuguese, and a clerk employed who writes and translates that language correctly.

Representation on the spot, by a good traveller knowing the country, is essential, and the short-sighted meanness of the common exporting houses is strongly condemned. First class German houses pay their men equal to £60 monthly, with commission and travelling expenses, *as incurred*. This may amount to £2 or £3 daily. Hotel charges are not less than 12/6, and porters and baggage charges are proportionately high. Every pound of luggage put in the brake van pays. Credit is also necessary for at least three months. Packing requires the greatest care and attention, and, as suggested by the results of experiments made in the sewing machine and phonograph trade, a stock may be advantageously carried at a central dépôt (Rio de Janeiro), and goods sold on monthly payments. Singer's charge 5\$000 a week (6/3) for hire of machines. Almost any goods can be sold in this way, such as musical instruments, furniture, ornaments, etc. A common way of doing business locally, is to form a club of 60, 80, or 100 members, and draw weekly chances for clothing, jewellery, etc. Probably the best way of doing a large and profitable trade in Brazil is to open locally with the latest novelties, and employ Brazilian salesmen, under European supervision. If travellers are sent from England they must be good men, tactful, sympathetic, well read, gentlemanly above all, and possessed of tenacity and patience, and should be *well paid*, properly supported, and able to speak Portuguese.

FLOATING DOCK.

Tenders were invited in Europe for the construction of a floating dock to accommodate vessels of the very largest size, and also for a docking plant. Tenders opened in October, 1909, were all rejected owing to too high estimates.

The Federal Government has neutralised a zone in the State of São Paulo, and coffee *ex* Minas Geraes will be allowed to pass through to Santos without paying any duty to the former state.

A wireless telegraph station will be set up at Olinda (Recife), and another, in connection, on the island of Fernando do Noronha. From thence it is expected to come in touch with Europe directly.

PAN-AMERICAN BANK.

Pierpont Morgan is arranging a bank under the above title, which will commence operations shortly.

INDUSTRIES.

There are in the Republic (1908) 2,378 industrial establishments, with 123,931 employees. A capital of some £37,000,000. Of these, 584 are in Rio State, and 551 in Minas Geraes, and in São Paulo 323.

The principal industry is cotton manufacture, and there are 137 mills in this business, with 41,018 work-people. All of these are paying large dividends, and increasing their output. All the raw material used is Brazilian.

PAPER MILLS.

Two or three only in Rio and São Paulo, making coarse wrapping paper and cardboard from refuse of sugar cane, grasses, reeds, etc., the most useful plant being the pirí-pirí, or papyrus brasiliensis.

The State of Paraná, with its pine forests, offers an unequalled opening for the above.

INDIA-RUBBER GOODS.

15 per cent. export duty is charged on raw rubber, and at least 50 or 60 per cent. on manufactured goods entering the country, of which a very large quantity, indeed, are used.

There are openings for biscuit, fancy soap, starch, and chemical works, box makers, canneries, steam laundries and saw mills.

There are no steam fishing boats, no piano manufactories, or factories where jams, jellies and marmalade are made on English lines, although the consumption of the best European brands is large and increasing.

There are, in fact, openings for all kinds of factories, works, and mills, and inducements are offered by various municipalities, such as free sites, lighting, and power for a period, and exemption from local taxes. A nominal duty is charged on machinery for manufactories, and in many cases it is admitted entirely free.

MOTOR CARS.

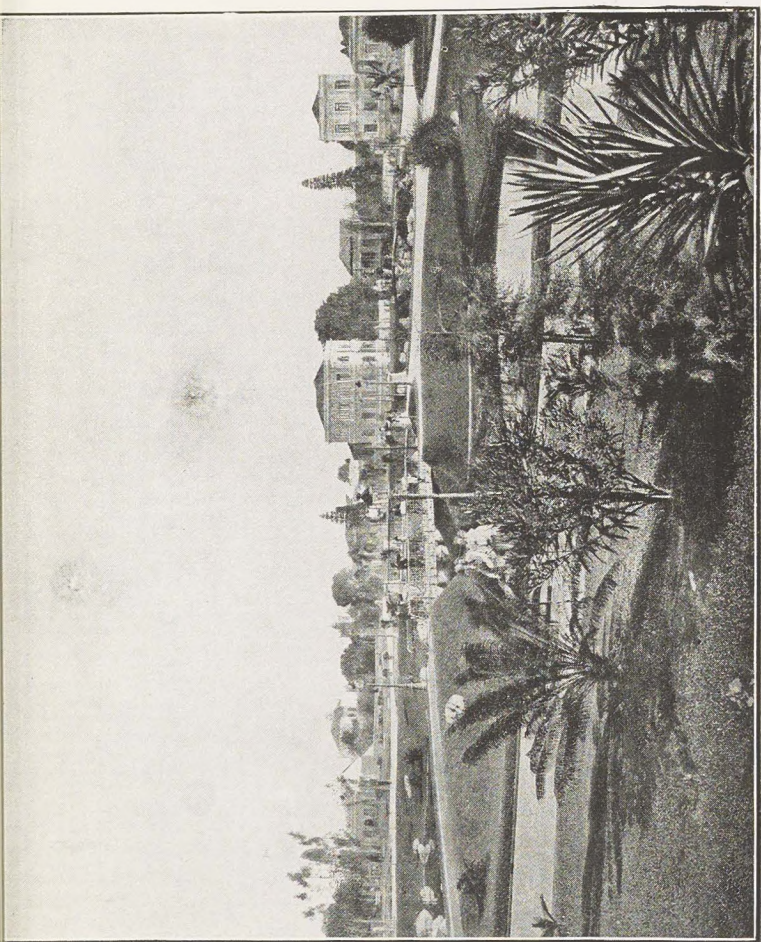
There are some 450 motor cars at present in Rio de Janeiro, and about 100 in São Paulo. A good market is open for good low priced and *strongly built* cars.

HOTEL.

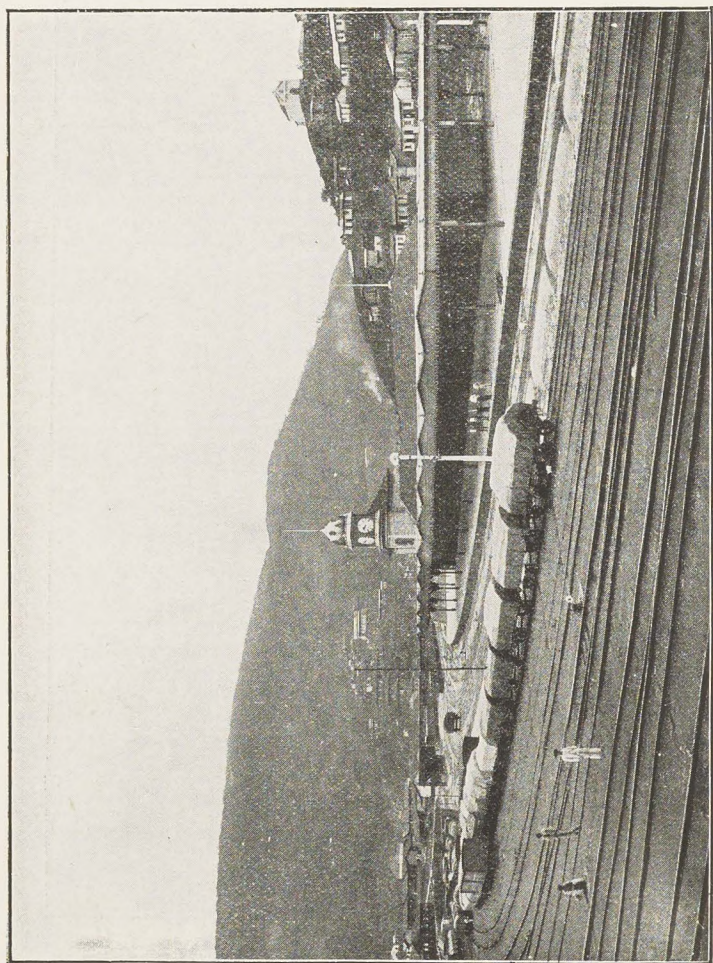
There is a first rate opportunity for a really high-class hotel in Rio, and one on up-to-date lines would be welcomed.

INTERPRETERS.

The Secretary of the British Legation in Brazil suggests the employment of interpreters to commercial travellers. This is not at all a practical idea, first because of the great difficulty of getting a suitable man, and secondly because of the great expense entailed. Again I *insist* on the *necessity* of the traveller knowing Portuguese *himself*.



PLACE OF THE REPUBLIC, SÃO PAULO.



ALTO DA SERRA RAILWAY STATION,
Near São Paulo, São Paulo Railway.

Commerce, etc.

The Budget for 1910 is estimated as follows:—Revenue, £29,800,000; expenditure, about £29,000,000. The Budget of the State of Minas Geraes is expected to leave a net balance of £30,000. The total national debt in 1907 was £156,965,194. The debt of the municipality of Rio de Janeiro being calculated as 82 francs per head of the population, or £3 3s. 6d., as compared with Rome, 428 francs per head, and Milan, 183 francs. Rio is one of the most heavily indebted cities in Brazil. In London it is 60 francs per head.

The gold deposits in the Conversion Bank (1906) were £5,240,000, and 1907, £10,120,000, and in March, 1910, amounting to nearly £15,000,000.

This bank was organised in 1906, 6th December, to issue convertible notes, at a fixed value of $\frac{1}{3}$ per milreis. The gold handed in to be kept in deposit, and not used for any other purpose than in exchange for the above notes, which, once received, shall be destroyed. When the deposits reach £20,000,000, and the notes issued attain the value of 320,000,000\$000, the further issue of such cédulas shall cease, and the rate of exchange shall be fixed at a higher rate. In this case notes in circulation will be recalled. The general effect of this measure has been good, and during the last few years immense quantities of the old ordinary notes of low value, have been destroyed, and are being replaced by the new silver coinage. This is a step towards the adoption of a gold standard, and a decided advance in the financial position of the country, which (it may be stated in passing) has never yet failed to pay the interest on its foreign debts, and has long since begun to liquidate the principal.

Banco do Brazil (National Bank).—Operations, 1908, £34,512,146, as compared with 1907, £24,726,801. A

dividend of £1 1s. 3d. per share was paid during the year.

With regard to the São Paulo State loan of £15,000,000, so highly considered as to be guaranteed by the Federal Government (Presidential Decree of the 10th of December, 1908) this has been subscribed for over 42 times, and such financial wiseacres as Carnegie and Rockefeller figures largely amongst the holders of stock.

These bonds must be redeemed at par on or before the first of January, 1919. The issue was at 92½ per cent., and the object of the loan is the redemption of the balance of the exchequer bonds (1906), and the repayment of any advances against coffee purchased by the State Government. The São Paulo and other Governments agree not to enter into any further engagements to purchase coffee, or to create any type of valorisation scheme, whilst any of the bonds of this (1908) issue are outstanding. The proceeds of the 5 francs surtax on each bag of coffee exported, and of 7,000,000 sacks belonging to the state, and now in bonded warehouses at London, Havre, Hamburg, New York, etc., are calculated to easily cover the loan.

1906.	1907.
Imports, £33,204,041.	£40,400,000.
Exports, £53,059,480.	£54,000,000.
Imports first 3 months, 1907, £9,082,543.	
" " " 1908, £9,812,907.	

The bulk of the 1907 imports are as follows: Great Britain, £12,100,000; Germany, £6,200,000; U.S.A., £5,000,000; Argentina, £3,600,000 (flour and wheat); France, £3,400,000; Portugal, £2,200,000 (wines). Exports to United States, £17,000,000 (principally coffee); Germany, £9,400,000; Great Britain, £8,600,000; France, £7,000,000; Belgium, £2,800,000; Holland, £2,000,000.

The most noteworthy thing with regard to the imports is the gradual advance of Germany, and the great loss of France, and the *comparative* decline of British trade with Brazil. In another place will be found the reason of this, so no comment is considered necessary here.

The leading articles of export were: Coffee, £28,400,000; rubber, £14,000,000; cocoa, £2,000,000; cotton, £1,700,000; herva matte, £1,600,000; tobacco, £1,200,000, and sugar, £634,000. A decrease in rubber, owing to decline in prices, as well as in cocoa, due to same cause.

COFFEE EXPORTS.

1906-07—20,190,000 sacks (record).

1907-08—11,133,000 „

1909-1910—12,099,279 (estimated.)

There are now 654,000,000 coffee trees in the State of São Paulo alone.

FLOUR.

The tariff concession of 20 per cent. on United States flour has been of little benefit to that country, as the Argentine Republic dominates the market, her exports to Brazil having increased from 37,000 tons in 1902 to 122,000 tons in 1906.

Imports of flour from the United States decreased from 46,000 tons to 24,000 tons in the same period. Ninety per cent. of the wheat imported is of Argentine origin.

Shipments of flour in 1908, 112,000 tons, to Brazil from Argentine. Total imports of flour 151,076 tons.

Trade in 1908 (in common with the rest of the world) fell off somewhat (18.4), or some £10,000,000 in exports, and £2,000,000 in imports.

Trade for 1907-9.

	1907.	1908.	1909.
Imports	£40,527,603	£35,421,410	£37,111,748
Exports	£54,176,898	£44,155,280	£63,724,440

December, 1907, £3,599,291 1909, £7,878,891

Exportation of the nine principal products. (From the Department of Commercial Statistics, Rio de Janeiro, January 29th, 1910):—

	1908.	1909.
Coffee (sacks) ...	12,658,457	16,880,696
Value ...	£23,039,231	£33,475,170
Rubber (kilos) ...	38,206,461	39,026,738
Value ...	£11,784,637	£18,926,061
Tobacco (kilos) ...	15,263,864	29,791,757
Value ...	£841,290	£1,339,336
Sugar (kilos) ...	31,577,394	70,207,784
Value ...	£305,597	£689,266
Matte (kilos) ...	55,314,625	58,017,850
Value ...	£1,650,341	£1,657,787
Cocoa (kilos) ...	32,955,920	33,817,739
Value ...	£1,977,457	£1,598,959
Cotton (kilos) ...	3,564,715	9,968,114
Value ...	£206,158	£591,814
Hides (kilos) ...	30,411,943	35,783,027
Value ...	£1,316,403	£1,819,541
Skins (kilos) ...	3,562,886	3,897,199
Value ...	£704,121	£972,319
Total Value	£44,155,280	£63,724,440

Specie and Foreign Bank Notes—

1907, £4,410,621 1909, £8,777,694

RUBBER.

Exports in 1906 were 37,000 tons, and 1907, 40,000 tons.

COCOA.

Total crop (1907), 60,000,000 pounds, thus leading amongst the world's producing countries.

PRODUCTION—HERVA MATTE.

1902	—	41,928,586	kilogrammes.
1903	—	36,129,555	„
1904	—	44,162,052	„
1905	—	41,119,930	„
1906	—	57,716,503	„

Matte is worth about 9d. per lb. (wholesale) in England. This includes freight and dock dues, and there is no customs duty on it.

The principal consumers are Argentina, Uruguay, Chile, Italy, France, Portugal, Germany, and Belgium.

FOREIGN BANKS IN THE REPUBLIC.

London and River Plate Bank	... capital	£2,000,000
London and Brazilian Bank	... „	£2,000,000
British Bank of South America	... „	£1,300,000
Brasilianische Bank für Deutschland	„	£500,000
Banco Commerciale Italo Brasiliano	„	£300,000

The Central Agricultural Bank was organised by decree No. 7,010 of the 9th of July, 1908.

Its duration shall be 30 years, and the head office shall be at Rio de Janeiro. Capital 300,000 contos of reis in 150,000 shares of 200 milreis each.

The principal object of the bank will be loans on approved security to agricultural societies and corporations.

PUBLIC WORKS.

The port works of Rio de Janeiro, Santos, and Bahia are being carried out with despatch, and those of Pará are begun, and the works at Rio Grande do Sul and Victoria will speedily be inaugurated, as well as those at Pernambuco. The latter will, without doubt, prove of the greatest benefit to the commerce of that port. Those of Santos, when finished, will include $2\frac{1}{2}$ miles of quay, with rail alongside, and deep water at any state of the tide. The new market, opened December 14th, 1907, at Rio, covers an area of about 24,000 square yards.

With regard to iron products, cotton piece goods, and food stuffs, it is probable that the imports will decline, as the natural tendency of the country is to supply itself. The greatest field for European energy is in the employment of capital, in the Republic. The return on his outlay insured to a judicious investor, is most decidedly far greater than he can expect to-day in England, France, Germany or elsewhere. Brazil urgently needs men and money.

British investments in Brazil (1908) total £135,610,024. As an instance of public faith in Brazilian bonds, it may be said that the last issue of Rio de Janeiro (city) was over subscribed in 20 minutes. Higher interest is assured in Brazil than in any other foreign country, and with absolute security.

France has invested $1\frac{1}{2}$ milliards of francs in Brazil.

There are 600,000 Portuguese in Brazil, and they send home some £3,600,000 annually. The Italians number nearly $1\frac{1}{2}$ millions, and their savings which find their way to Italy amount to 200,000,000 liras, or about £7,500,000. If we consider the vast sums which pass from other sources to Germany, Spain, Syria, Holland, the United States, Austria, England, etc., we shall understand a

little what a great factor Brazil is to-day in the financial world, and what a constant stream of gold leaves its shores.

Post, Telegraphs, and Telephones.

Postal rates have already been given. Mails leave Southampton and Liverpool alternate weeks, Fridays and Thursdays respectively, and *via* Bordeaux same days as *via* Liverpool. Mails leave Rio de Janeiro weekly by Royal Mail steamer on alternate Wednesdays, and by other steamers according to arrival. In 1908, 266,000,000 letters were delivered in the Republic and the receipts were 10,000,000\$000 (paper).

Telegraphic communication is established between all parts of the Republic at the following rates:

1 State,	100 reis	a word.
2 or 3 States,	200	„ „
4 or more States,	300	„ „

75% abatement for press telegrams.

WIRELESS TELEGRAPHY.

Wireless telegraphy is now used on board the Brazilian war vessels, and various transatlantic lines have also installations. Experiments have been made with the Telefunken and De Forest systems, as well as a French one, and there are now stations at Rio de Janeiro (5), Pará, Santarem, and Manáos, and others are in course of erection.

TELEPHONES.

The Federal Government has telephone lines between Rio de Janeiro, Nictheroy, and Petropolis, with six stations in the capital. The fire brigade and the department of Public Works also possess systems.

There are eight different kinds of instruments in use in Brazil, and 39 separate installations (January 1st, 1908).

Maranhão	...	2	lines	
Piauhý	...	3	„	
Ceará	...	1	„	
Pernambuco	...	1	„	
Alagoas	...	1	„	
Bahia	...	2	„	
Espirito Santo	...	1	„	
Rio de Janeiro	...	10	„	(Under control of the Light and Power Co.)
Federal District	...	1	„	
S. Paulo	...	14	„	
Paraná	...	1	„	
Rio Grande do Sul	...	25	„	
Minas Geraes	...	2	„	

There are also other small concerns working, but no official information is available at the time of writing. It will be seen that there is ample scope for enterprise in this direction in all parts of the Republic.

BRITISH METHODS OBSOLETE.

The *Times*, in its changed character, still merits the well won title of Thunderer. In the special South American edition of December 28th, a section larger than the whole of an ordinary issue of the paper, is devoted to Brazilian affairs, and the fact is mentioned that England is a week further away from Brazil than she need be. I will myself take up the cudgels, but primarily in the interest of the great Republic. Present conditions demand a rapid transit system between Brazil and Britain, and a speedy delivery of perishable fruit and other commodities will not only result in increased exports, but will be the means of encouraging many thousands to visit Brazil who are scared by the present

tedious voyage. The imperative necessity has arisen of a service to and from Brazil only, at any rate making Rio or Santos a terminal port.

Whilst correcting the proofs of this chapter news comes to hand that the Brazilian Lloyd has started a service of steamers to Europe, with sailings every ten days, and through bookings to Paris and London. This service commenced in February (1910).

THE NATIONAL BANK.

The Bank of Brazil has paid a dividend of 9% for 1909, and Rothchilds have addressed a telegram of congratulation to the administration. A balance of £163,670 net remains in the coffers of the bank, and during the second half of 1909, no less than £6,200,000 was sent to London. Interest of 3% is allowed *on current accounts*. This should open the eyes of those who have to place their capital in British banks.

OTHER BANKS

In the Capital and the States.

Deposits	120,000,000 francs
Current accounts (creditors) ...	515,000,000 „
Current accounts and advances	220,000,000 „
Loans, etc.	236,000,000 „
In reserve	290,000,000 „

From Le Brésil, 13th February, 1910.

CHAPTER VIII.

Transport.

TRANSATLANTIC.

ROYAL Mail Steamers, fares, first class, £33; second class, £22; third class, £8. Leave Southampton Fridays, sometimes weekly, otherwise fortnightly, calling at Lisbon Monday, and Madeira Wednesday, and reaching Pernambuco as a rule on the 13th day, and Bahia on the 14th, and Rio on the 16th night or 17th (morning). Their newest boats have a tonnage of 10,000 to 12,000, and are up-to-date in every particular, the *Asturias* being the best. Pacific Line from Liverpool alternate Thursdays, calling at Lisbon on the Tuesday, and making Rio in 19 or 20 days. Messageries Maritimes (French Line) from Bordeaux alternate Fridays, taking 15-16 days to Rio. The Hamburg American and Hamburg S. American lines run fine steamers also, calling at Dover or Southampton and Lisbon, and taking about the same time as the other boats. The Holland Lloyd (from Dover) with new fine steamers and low rates.

The N. German Lloyd, Bremen and Antwerp to North, Central, and South Brazil.

The Hamburg American (Dover), and Hamburg S. American (Hamburg) (mail), to North, Central, and South Brazil.

The Transports Maritimes, Marseilles to Pernambuco, Bahia, Rio and Santos.

The La Veloce, Lloyd Italiana (mail), Lloyd Sabauda, and La Ligure Brasiliana, Genoa; Folch y H'nos, Barcelona; Companhia Adria, Lloyd Austriaca (Trieste, etc.), to Rio and Santos.

Booth Line (mail), Iquitos Line (Liverpool); Hamburg American and S. American Companies, Hamburg, to Pará, Manáos, and Iquitos.

Of cargo or tramp steamers there are several lines, but the Lamport and Holt Company has now some good boats with up-to-date first class accommodation (for male passengers), running from Liverpool or London to Bahia, Rio, and Santos, and back to Europe *via* New York or New Orleans, taking coffee to the U.S.A. and returning to Liverpool or Manchester with cotton. The fares by these boats (single only) are for first class about the same as the second class rates by the mail boats. The other principal lines with modern boats are those of the Prince, Nelson, MacIver, and Houlder Companies. *Homeward bound*, there is a monthly service by the fine steamers of the New Zealand Shipping and Shaw, Savill Lines. Of all the vessels engaged in the S. American service the Italian Lloyd are the finest, largest, and *by far* the most rapid, making 19 knots as compared with 13½-14 run per hour by the British, French, and German mail boats. One or two of the former boats have a splendid restaurant system on board.

The Amazon has a whole system of steamers to itself and its branches, foremost amongst the lines serving this magnificent water course is the Amazon Steamship Company with over 40 boats. This is the only line exclusively trading in Brazilian waters under the British flag (by special concession).

With this exception the whole of the coasting trade is carried on in National bottoms.

The Brazilian Lloyd has 72 ships totalling 140,000 tons. It receives a bounty of £187,000.

Services : (1.) North (mail) every alternate Thursday to Bahia, Maceió, Pernambuco, Ceará, Maranhão, Pará, and Manáos.

(2.) North (weekly) Saturdays to Victoria, Cabedello, Fortaleza, Tutoya, Obidos, Santarem, Itacoatiára, as well as all the ports mentioned above.

(3.) New York (monthly) *via* Victoria, Bahia, Maceió, Recife, Cabedello, Ceará, Maranhão, Pará, and Barbadoes.

(4.) Monthly to Caravellas (Bahia), calling at Victoria, S. Matheus and Cannavieiras, and some minor ports.

(5.) Sergipe (15th and 30th of month) *via* Victoria, Caravellas, Bahia, Aracajú, etc.

(6.) Rio Grande do Sul (Thursdays) by Santos, Paranaguá, and Florianopolis.

(7.) To Buenos Aires (alternate Saturdays) *via* Santos, Paranaguá, S. Francisco, Rio Grande, and Montevideo, etc., etc.

(8.) To Florianopolis, calling at all ports (first and third Saturdays).

(9.) From Florianopolis two voyages weekly, north to Paranaguá, south to Laguna.

(10.) Montevideo to Corumbá (Matto Grosso), by Rosario, Paraná, Corrientes, Assumption, etc. (every other week).

(11.) Corumbá to Cuyabá, and a line from Corumbá to S. Luiz de Cáceres.

(12.) Cargo service to New York, taking goods to ports arranged.

Total extension of lines, Manáos to Montevideo, 4,300 miles, thence to Cuyabá, 2,063 miles, total, 6,013, deducting deviations to smaller ports.

Empresa de Navegação Costeira (Lage Irmãos), 15 steamers of some 13,000 tons in all. Two lines, north to Pernambuco, south to Florianopolis.

Serviço Marítimo J. Garcia, two small steamers serving the southern parts to Antonina.

Empresa de Navegação de Rio de Janeiro, with three boats. Northwards to Aracajú.

Esperança Marítima. Six steamers up to 1,200 tons. South to Rio Grande, north to Aracajú.

S. João de Barra. 10 small steamers sailing between Rio de Janeiro and Espírito Santo.

Companhia Commercio e Navegação Rio de Janeiro. 12 steamers totalling 22,000 tons, and four smaller boats. Cargo boats solely to north and south Brazil.

Navegação Bahiana. Two boats of 300 and 350 tons on coast of Bahia, etc.

Companhia Pernambucana. Eight vessels of 7,000 tons in all. North to Fernando do Noronha island, south to Bahia.

Campanhia Maranhense. Four steamers. Coast of Maranhão, Ceará, etc., etc.

There are also lines of small steamers on the rivers S. Francisco, Itapicurú, and other streams, as well as sailing craft that take passengers.

BRAZILIAN PORTS.

Geographical miles and distances from Rio de Janeiro. Northwards—Victoria, 270; Bahia, 735; Aracajú, 904; Maceió, 1,015; Recife, 1,125; Parahyba, 1,195; Natal, 1,273; Fortaleza (Ceará), 1,533; Amaração (Piauhy), 1,739; São Luiz (Maranhão), 1,915; Belem do Pará, 2,280; Manáos, 3,204.

Southwards—Santos, 199; Paranaguá, 364; Florianópolis, 523; Rio Grande, 875; Porto Alegre, 1,008; Montevideo, 1,180; Corumbá, 2,803; Cuyabá, 3,242.

Distances—From Rio to New York, 4,748 miles; time 17-19 days, *via* Barbadoes (Lamport and Holt Line). Rio to Genoa, 5,040 miles, 13½-15 days. Trieste, 5,838 miles; Bordeaux, 4,894; Southampton, 5,034; Bremen, 5,507; Hamburg, 5,519; Antwerp, 5,244; Odessa, 6,341; Libau, 5,900; Valparaiso (*via* Magellan's Straits), 4,241 miles. Time *from* Wellington (New Zealand), 23 days to Rio de Janeiro. From Rio de Janeiro *to* Montevideo, four days. By coasting steamer up to 15-16 days. Rio to Paris, *via* Barcelona, 13 days; *via* Cherbourg, 16 days, or Lisbon, 16 days. Rio to Santiago or Valparaiso, *via* Buenos Aires, and the Pacific Railway, 7 days. By the same route (and steamer) to Callao, 17 days. From Cuyabá to Manáos by sea, not less than six weeks are required at present, changing steamer at Rio de Janeiro (Brazilian Lloyd).

THE NEW QUAYS, RIO DE JANEIRO.

The total extension of the new quays is—19,100 metres, and the depth of water 10 metres, or nearly 33 feet.

These quays will be leased to a company that the Government considers capable of properly managing them, until the 31st of December, 1921.

Exemptions from Taxes.

Boats, launches, and other small craft engaged in the transport of passengers and baggage, and belonging to ships loading or discharging at the quays.

Mails, specie, belonging to the Government or to the States, passengers' baggage, goods belonging to foreign legations, immigrants and their belongings, and embarcations of war vessels are to be considered free of the port taxes, and other dues.

* The taxes payable by merchant vessels for water, port dues, loading and unloading are under revision.

RAILWAYS.

The first line opened in Brazil was the Mauá line, which, leaving the little port of the same name, made its way across the low lands to the foot of the Estrella Range. This was inaugurated in 1854, and was soon climbing the Serra to Petropolis, and running down the valley of the little Piabanha towards Entre Rios.

The first section of the Central Railway (then called Dom Pedro II.) was opened in May, 1858, from Rio to Queimades.

The most important lines at present under construction are Madeira-Mamoré, north-west of Brazil, from Bahurú in western São Paulo, to Corumbá, 1,407 kilometres. São Paulo-Rio Grande, and the Goyaz Railway.

The Central Line has now reached Pirapóra, 1,009 kilometres from Rio de Janeiro.

This (Government) line has now instituted a system of carnets kilometricas, or 1,000 kilometres tickets. The rates are 1,000 kilometres 51 milreis; 2, 84 milreis; 3, 118 milreis; 4, 152 milreis; 5, 195 milreis; 6, 230 milreis.

* March 1st, 1910.

EXTENSION OF LINES, 1907-8.

Lines.	Working kilo- metres.	In con- struc- tion.	Receipts in Milreis.	Expenses in Milreis.	Number of Passengers in Millions.	Goods Traffic. Tons.
Central	1,737	...	31,889,390	30,920,809	22½	1,053,711
Mogyana (S. Paulo Minas)	1,362	...	19,493,453	10,010,262	1½	711,000
Sorocabana (S. Paulo)	1,146	...	12,696,598	7,629,310	1½	419,189
S. Paulo Railway	191	...	25,321,702	...	1½	1,964,229
Paulista	1,958	...	24,861,763	10,202,340	1½	975,783
Other lines	350	...	...	...	...	...
Leopoldina (Rio, Minas, Espírito Santo)	2,377	842	19,807,920	13,202,052	2½	585,115
Oeste de Minas	967	...	2,211,616	2,125,010	1½	50,310
Minas and Rio	170	...	1,999,122	1,182,703	1½	67,237
Baturité (Ceará)	297	445	1,244,359	905,268	1½	55,741
Bahia - S. Francisco	575	650	1,144,434	826,404	1½	86,859
Madeira - Mamoré	86	260	...	...	...	...
Recife R. - S. Francisco	124	739	1,758,688	873,259	1½	181,435
Sul Pernambucano	193	908	539,391	542,098	1½	85,855
Central da Bahia	316	...	1,014,759	739,397	2½	35,792
Bragança (Pará)	195	594	758,708	1,598,119	39 thousand	2,695
Sobral (Ceará)	216	...	516,759	267,655	20	18,657
Natal - Independência	171	...	249,755	258,843	28	19,821
Conde d'Eu (Parahyba Norte)	165	...	727,575	595,221	124	55,273

TRANSPORT.

Central de Pernambuco	...	228	...	1,374,052	822,577	$\frac{1}{10}$ million	79,079
Recife - Limoeiro	...	260 $\frac{1}{2}$	...	1,305,669	832,988	$\frac{2.68}{1000}$	107,895
Central Alagoas	...	150	...	799,347	557,477	$\frac{1}{10}$	102,181
Paulo Afonso	...	116	...	33,592	126,095	small	small
São Francisco (Bahia)	...	452	...	1,219,285	1,055,968	...	...
Nazareth, etc.	...	157	...	845,486	460,607	...	56,907
Bahia and Minas	...	376	*	502,144	510,840	small	...
Victoria and Minas...	...	208	*	434,457	502,831	...	...
Sapucahy (Minas and Rio Janeiro)	...	532 $\frac{1}{2}$	*	1,053,322	1,475,484	$\frac{1}{10}$	49,112
Paraná	...	417	...	3,926,470	1,445,515	$\frac{1}{10}$	178,101
São Paulo Rio Grande (Paraná)	...	417	*	706,871	939,655	small	34,335
Rio Grande do Sul...	...	1,624	...	6,980,643	4,871,468	$\frac{3}{10}$	245,586
D. Thereza Christina (Santa Catharina)	...	116	*	101,953	341,185	small	small
Quarahim Itaquí (Rio Grande)	...	176	...	255,029	253,979	...	...
Muzambinho (Minas)	...	238	...	693,394	740,020	$\frac{1}{10}$	38,076
Rio do Ouro, etc. (Rio de Janeiro)	...	114	...	415,692	513,376	$\frac{3}{10}$	19,968
Bahurú - Itapura (São Paulo)	...	92	*	143,981	285,683	small	small
Some 12 short lines	...	500	...	...	...	...	...
Total	...	17,548	...	171,536,219 (1907)	116,994,500 (1907)	38,529,528 (1907)	7,681,839 (1907)

We have thus 17,547 kilometres 552 metres working, and 260 kilometres constructing in 1908. On the 31st of December the total length of lines was 18,524 kilometres, and in the beginning of 1909 3,000 kilometres were in construction, making 21,524 in all.

The Goyaz Railway will now pass through Catalão, the second city of this state, and have two branches, one to Uberaba, and the other to near Araguary, thus serving the northern boundary of São Paulo-Minas Geraes.

The Central Railway reached, in 1909 (December), its present terminal point, "Pirapóra," on the São Francisco river. There will also be a loop from the Victoria-Diamantina Railway to Curvello on the Central Railway; a new line from São Paulo, Mogy Mirim to Santos; an extension of the Leopoldina Railway to Cabo Frio (north of Rio), and the doubling of this Company's lines and acceleration of its service to Petropolis, this trip taking only $1\frac{1}{4}$ hours instead of two, and 10 trains being proposed daily as a minimum (instead of four), and the reduction of freights on this line, and a direct service between Rio de Janeiro and Victoria (Espírito Santo).

The Corcovado Railway will be operated by electricity in future. A project is also being started for a line between Petropolis and Theresopolis; and several other small lines are planned to link up the existing trunk railways, and increase the facilities for ocean transport.

In Santa Catharina 200 kilometres of line are surveyed, and the Government will grant a subsidy of 15 contos per kilometre, repayable according to the profit of the Company.

The rail is also now complete from Rio to Porto Alegre, a distance of 2,752 kilometres, taking 96 hours over the journey.

The Suburban service of the Central Railway will be electrified at a cost of 5,000 contos. During 1908 this (residential) service carried over 20,000,000 passengers.

Rio Grande do Sul will have the first rail motors, on the line Venancio Aires-Soledade.

During the past year, 1909, two new English Companies have been formed, viz., Brazil Great Southern, capital £100,000, and the Araquará Railway (extensions in São Paulo).

In a few years it will be possible to travel by rail from Rio de Janeiro to *any* of the Brazilian States, or to Uruguay, Paraguay, Chili and Bolivia, and (if the proposed bridge is built across the River Plate) even to Buenos Aires. In Brazil, fortunately for the prosperity of the country, it is not the railways that have awaited population before adventuring into the interior. On the contrary they have (as is only natural in new countries) proved the pioneers of civilisation everywhere throughout the Republic. Certainly they will be harbingers of peace, as well as progress, wherever their twin rails extend.

Where receipts are less than expenses, in several cases, (noteworthy *) the fact is due to length of line under construction.

In the near future all the lines in Brazil will be linked up, and as far as possible a uniform system of freights arranged.

Electricity and Water Power.

The numberless waterfalls in almost every State in the Union are destined to play a great part in the commercial development of the Republic. Already some of the greatest enterprises on the American Continent owe their success to this source. The Rio Light and Power

Company has made use of a great dam at Ribeiro-das-Lages, 81 kilometres from Rio de Janeiro, with a capacity of 224 million cubic metres of water. With the electric force derived from the works it is possible to supply light and power to the whole of the Capital, besides operating a very extensive system of tram cars. The same concern has a great power station in São Paulo, utilising the Tieté river 33 kilometres from the city. On the Rio Grande, in the same state, the Urubuhunga and Itapura falls have a volume of water calculated to furnish a million horse power. A new station is in operation at Piabanha (Petropolis) giving some 15,000 horse power, and providing current for the illumination of Nictheroy, and Petropolis itself. The tremendous falls of the Iguassú, Paraná and Paulo Affonso, are as yet entirely unexploited, as well as many others, larger by far than any European falls.

Pará has electric light, and 55 kilometres of tramways, and Manáos is said by Paul Walle to be the best illuminated city in Brazil. Maranhão, Bahia, Campos, Friburgo, Bello Horizonte, Curityba, Porto Alegre, *en fin*, most Brazilian cities of any importance use electricity both for power and lighting. Even such out of the way places as Diamantina are indebted to this wonderful force as yet in its infancy. Brazilian towns in general are so situated that it is only necessary to make use of the water power close at hand. Here then is a great opportunity for the electrical engineer to call into being forces that are still lying dormant in every part of Brazil.

CHAPTER IX.

Natural History—Fauna.

FISHES.

IN this chapter I have followed the order in the section ("Animal Kingdom") of the great work in Portuguese, *O Brazil*, and commence by studying the ichthyology of the country. It is necessary at this juncture to refer the reader to the wonderful researches made by Agassiz (see appendix).

The food fish of greatest value in Brazil is the pirarucú, inhabiting the rivers and great lakes of the Amazon region. It measures some seven feet in length, and weighs up to 220 lbs. in rare cases, the average being about 120 to 140 lbs. It has an elongated snout covered with large bony plates or scales, the body being cylindrical, with a somewhat flat form laterally. The tongue is large and osseous. This valuable animal takes the place of meat to a great extent, and is eaten dried very frequently, and is seen now and then in the markets of the far south of Brazil. It is caught with a harpoon, in clear water, usually in September and October, and is then salted. The price per kilogramme locally, dried, is from 1/- to 2-, according to the district. When visible in Rio, it fetches as much as $3/6$ a kilogramme.

The tainha (a kind of tench) is found in many parts of Brazil, both north and south, and is caught in vast numbers by means of nets.

The capital (Rio Janeiro) is the principal market for fish, and the greatest variety are offered for sale, sometimes, however, the quantity is exceedingly small, as the vessels engaged in the trade from Cabo Frio, St. João da Barra, Angra dos Reis, and Paraty, are so small that they are unable to go out in rough weather, or to remain at sea for any length of time.

The principal fishes of the Rio market are robalos, a variety of sturgeon, from 6/- to 18/- each; douradas (dorados), garaupas, 3/6 to 6/- a kilogramme; corvinas, linguadas (soles), sardines, badejos (cod), bijupirás, meros, 3/6 to 6/- a kilogramme; mullet (fresh water), pescadas (whiting), xernes, 2/6 to 5/- a kilogramme. Besides these there are multitudes of lesser value, and prawns, lobsters (several sorts), various kinds of crabs, oysters, clams, mussels, etc., etc. On the rivers one also finds the surubim, up to six feet long. This is sold dried as a rule, and the price varies from 1/6 to 3/- a kilogramme. There are also bagres, piranhas, trahiras, jundiás, piabas and, to quote Agassiz, thousands of finny creatures entirely unknown in Europe. This savant calculated that there were more classes of fish in the Amazon alone, than in the whole of the Atlantic Ocean. The method of taking fresh water fish in Brazil is not regulated in any way by the appointment of fishery commissioners or other officers. The splendid natural preserves for trout are entirely without inhabitants. Most of the mountain streams are quite fishless, or inhabited by such kinds as lurk in the more sluggish and muddier parts. Where there are good fishing stations, the stocks are decimated by means of dynamite bombs, or several Brazilian substitutes for coccus indicus, or fishers' berries. By this latter means, sometimes the whole of a stretch of river is devastated.

Considering the extremely high prices quoted for non-game fish, it stands to reason that scientific stocking of rivers with the hardier kinds of trout, such as *S. fario*, would pay well. Experiments have been made with carp, in the State of São Paulo, and have met with success. Referring again to the salmonidæ, some encouragement for prospective introduction may be found in the fact that many sorts of fly are to be found on the rivers. I have myself encountered various kinds of caddis, in the usual type of case, and undoubtedly the temperature of the water is quite low enough, and all other conditions highly favourable.

There are some small fishes that consume a vast number of mosquito larvæ, and the Ministry of Agriculture has resolved to breed these largely in malaria haunted districts.

In spite of the abundant supply close at hand, a great deal of dried cod (*ex Nova Scotia*) is still consumed and to it may in all probability be traced many of the disorders of the stomach prevalent amongst the lower classes in Brazil.

The piranha (quite a small fish) is extremely voracious and swarms in the flooded savannahs of the States of Pará and Amazonas. The live stock suffer considerably from its attacks, according to Paul Walle in his *Au Pays de L'Or Noir*, where he states that the largest animals are frequently entirely consumed by its multitudes, attracted by the blood flowing from a single bite.

Many kinds of fish are very easily caught by rod and line, and it is a frequent occurrence to find one's capture seized when half-way to the bank, and bitten right off the hook by some cannibal fellow of a larger species. With regard to preservation it should be noted that the State of Paraná is the only one to see to the adminis-

tration of the law imposing a close season during spawning time, and regulating the size of the mesh to be used for different nets. Instruction is even given to the children in the elementary schools on the protection of fish and game.

Game, other Animals and Birds.

The supplies of the capital, in the way of game, come from the Serras of Tinguá, Estrella and the Organ Range principally, as well as from Barra Mansa, Merity, and as far as Novo Friburgo. Besides rabbits, hares, 2/6 to 2/9 each, deer, pigeons, pacas, and wild boars are occasionally seen. The best game birds are the mucuco, the jacú (penelope), and mutun (cassowary). Many smaller birds are sold in bunches of 20 to 30 different kinds and colours. Amongst these are found toucans, of various sorts, and such others as arapongas, tiribars, guaxes, and bem-ti-vis (I saw you well), the latter so named from its peculiar call.

The forests of all the states, especially far from human haunts, as in Amazonas, Matto Grosso, and Goyaz, are filled with parrots, fetching up to £1, macaws, £1 to £3 10s., sabias, one variety, *mimus lividus*, worth £5 to £7, bicudos, up to £2, canaries, cardinals, love birds, woodpeckers, avinhados (wine coloured), and, of course, the humble swallow and sparrow, owls, various kinds of hawks, urubús (a kind of gigantic raven), the common scavengers, more like a vulture than anything else. In Rio Grande do Sul, both black and white swans are found, as well as herons, storks, ernus, wild ducks and geese, water hens, flamingoes, partridges, quails, etc.

In the sea there are a hundred sorts of fowl, common to other oceans, and some peculiarly local. Pigeons are extraordinarily plentiful in some of the states where

leguminous plants abound. In Ceará thousands have been killed in a day or two's sport. Amongst the quadrupeds not mentioned, especially noteworthy are the tapir, living in the reedy lakes on the top of the coast and other ranges. Sometimes he is hidden in a dense forest of grasses six or seven feet high, and growing in tufts with deep holes between. This unwieldy animal is found within four or five hours of Petropolis, or two of Theresopolis, and a couple, or leash of good dogs are necessary to make him move out of his retreat. His hide makes excellent harness. When pursued by a jaguar, he rushes with tremendous force through the undergrowth, and in many cases where the great cat has succeeded in lodging on his back, the shock of the encounter with saplings and cane brakes, has not only torn the attacker from his hold but smashed his skull.

The great and little anteater are pursued for their skin, as are also the numerous family of felines, comprising *felis onça*, *felis onça nigra*, *felis concolor* (puma), the ocelot, wild cat, etc. The greater jaguar is hunted in the most courageous manner in Brazil. The native hunter armed only with a long knife, and a stout wooden fork with two prongs, approaches the jaguar, always looking straight at his eyes. When the animal springs at him he catches it on the fork and immediately stabs it in the heart. Amongst other quadrupeds we may notice the wolf, fox, marten, otter, *ratão* (beaver), *kinkajou*, *gambá*, and sloth. In 1905 about eight tons of skins of various sorts, including those of some half dozen species of monkeys, were exported, or a total value of £11,000. The simians, by the way, are well represented in Brazil, but none of them are comparable to those of Africa, as far as size is concerned. Of the domestic animals it is not necessary to treat here, except to say that races of

bovines accustomed to hilly districts do well in Brazil, as also goats. Horses are of a small wiry breed, but mules prove best adapted to the northern and central states. Pigs do well in the south, and in Minas, etc., whilst sheep are only suited to some parts of São Paulo, Paraná, Santa Catharina, and Rio Grande do Sul. Domestic poultry, including guinea fowl and Indian game fowls thrive in most places. The guinea fowls are stated to be very useful to keep down the reptiles.

Of the ophidians, the cascavel (rattlesnake), coral, python, boa-constrictor, jararaca, and surucucú, are the better known.

The most remarkable serpent is the *rachidelus-brazilii*, which has a penchant for devouring the most venomous of other snakes.

Turtles are not so common on the Amazon as fifty years ago, owing to the wanton destruction in taking them, and thinning out their eggs for the purpose of extracting oil. The turtle is largely used for food, and in Pará at the present time the meat costs some 6/- to 25/- a kilogramme, according to season. There are also six kinds of tortoises which form important additions to the diet of this region. The municipalities of the State of Pará obtain large sums from the taxes imposed on those engaged in the above trade. Oil is extracted from various kinds of lizards, tapirs, and capivarys, but the principal fount of this product is the whale.

WHALING.

Whale fishing is carried on along the coast line of the State of Bahia. The animal caught is a roqual (*Balaenoptera musculus*). It contains some 360 pieces of the so called whale bone, but their shortness (32 inches) renders them of little commercial value. The animal is from 30

to 70 feet long, and yields up to 5,000 quarts of oil. The season lasts from May to December, commencing in the south of Caravellas. There are thirteen whaling stations, eight of which are near Bahia city itself, five of which are on the island of Itaparica in the bay. The others (with the exception of Caravellas) are more to the north. The boats are about 30 feet in length, very strongly built with ribs not bent, but hewn to the shape required. On each side of the bows is a sort of cleat of natural bent wood. There is a single mast, steeped a little forward, with a huge mainsail, square in shape. Each boat has eight to twelve harpoons with some ten fathoms of one inch manilla line. There are also several spear pointed lances mounted on long poles, with six fathoms of $\frac{3}{4}$ -inch rope attached to them.

On each bow of the boat there are coils of 2-inch rope nearly 100 fathoms long, and down aft two more coils of 70 fathoms for emergency use, as well as oars, stores, and cooking utensils. Each boat has a crew of ten; all under the orders of the harpooner. The whalers go out each morning at sunrise, and return at nightfall. The method of approaching, striking and killing the animal does not differ much from that employed elsewhere, but after it is killed one of the crew must dive under it, and pass a rope round its mouth to secure the latter with, otherwise the animal would fill with water and sink. The whale is towed to the beach and cut up there, and the flesh is frequently sold and eaten. There are no modern appliances for trying out or refining the oil, and no means of utilising the refuse as manure. The average catch per season is 300 to 400. Salaries are small, but for each whale caught the harpooner gets £6 10s., the boat steerer £3 5s., and each of the others 12/6. The total number of men engaged is about 900, and there are

some 50 boats engaged in the trade, those from Caravellas being of about 15 tons burden each. The proceeds in 1903 were £30,000.

FISH GLUE.

The silurus (catfish) is the one which supplies most of the above, and the price obtained for it in the market at Pará is 3/- per kilogramme, in comparison with 1/6 from other sources.

The exportation of fish glue from Pará and other places in 1905 was 72,429 kilogrammes, worth £15,508.

FEATHERS, SCALES, ETC.

The following are the principal birds furnishing feathers for export:

Emu, parrot, macaw, toucans, humming bird. The most valuable are those from a peculiar sort of heron, and are taken from the head of the male, they are known in England as ospreys, and are worth £62 10s. a kilogramme (one conto of reis), locally. Most of these feathers (few in number in each bird) come from the northern states. In 1905, 158 kilos 627 grams were exported.

The feathers of the emu are from three to eight inches long, and the best are used in the manufacture of boas. Exportation (1905) 1,983 kilogrammes, value £1,600. Of the feathers from the immense variety of multi-coloured birds (exportation 25 kilos, worth £65 only), as a great many are used in the country, made up into ornaments, flowers, etc. The scales exported are from the sturgeon, groppers, etc. These are nearly all made up in Santa Catharina and Parahyba do Norte. Flowers are also made of shells, leather, etc. In Rio de Janeiro there are two or three houses making a speciality of ornamental

work of all kinds, including butterflies' wings, beetles' wing sheaths, etc., made up into an infinite variety of designs, and costing absurd prices, considering the mite given to the countryman who brings them in. Profits of 200 to 300 per cent. are very frequently made in this sort of business.

ANIMALS FOR COLLECTIONS.

The bulk of the stuffed, or simply dissected birds, such as toucans and humming birds seem, according to official data, to be exported to the United States and Argentina, at least as far as those are concerned which are not set up and mounted. There are always better prices obtainable locally for natural history specimens, but the demand is very small for the more expensive kinds.

For export: stuffed and prepared. Alligators two feet six inches fetch up to £1 10s., lizards same length £1 5s., monkeys of various sorts £1 to £1 10s., serpents (three feet and longer) £1 5s. to £2, falcons £1 2s. 6d., water hens, woodpeckers, humming birds (assorted kinds), £1 2s. 6d. to £1 5s. a dozen, penelopes (jacús) £1 10s., crabs and lobsters, mounted and varnished, £1 16s. a pair. Armadillo coverings or shells made into work baskets, etc., etc., up to £2 10s. Myriads of beetles and butterflies and other curious insects are also caught, of which the semiramis, up to £7 and £10 for a single specimen is most noteworthy.

More ordinary coleoptera and lepidoptera cost 12s. 6d. to £15, according to the number in a case, and their relative rarity. Amongst the better class of butterflies one may mention numbers of the argante, morphos (four kinds), caligos, heliconidae, danaedae, papilionidae, *T. agrippina*, *darius*, *codomanus*, etc., etc. A class of ants (*tanajuras*) from S. Paulo are also exported, these

are dressed in various costumes and put up in little boxes with a landscape painted in the background. Thus arranged, they sell for 12s. 6d. to £1 a box. These same ants are cooked and sold in large quantities in the interior of the state, and are considered a great delicacy. There are also various bizarre tinted fishes, varnished and exported, or sold locally at high prices. Apropos of this, a man came into a shop in Rio in my presence and sold a toucan for 200 reis (3d). I asked the owner of the store (a personal friend) how much he would sell the bird for when stuffed and prepared? The answer was—10\$000 (12s. 6d.)—verb sap.

There is yet room in the capital for a clever naturalist, who is at the same time a linguist (French and German being essential). The proprietors of the small businesses already existing have very little scientific knowledge, and their abilities as taxidermists are rather mediocre.

CHAPTER X.

Flora.

RUBBER PRODUCING PLANTS, ETC.

ACCORDING to the great text book "*Flora Brasiliensis*," of Martius, there are 10 species of hevea, besides a similar plant, *micranda siphonides*; and in Minas, *micranda etata*, and in Bahia, *micranda bracteosa*.

In Amazonas exists also the *tapurú*, the *castilloa elastica*, and the *hancornia speciosa*, of some six kinds.

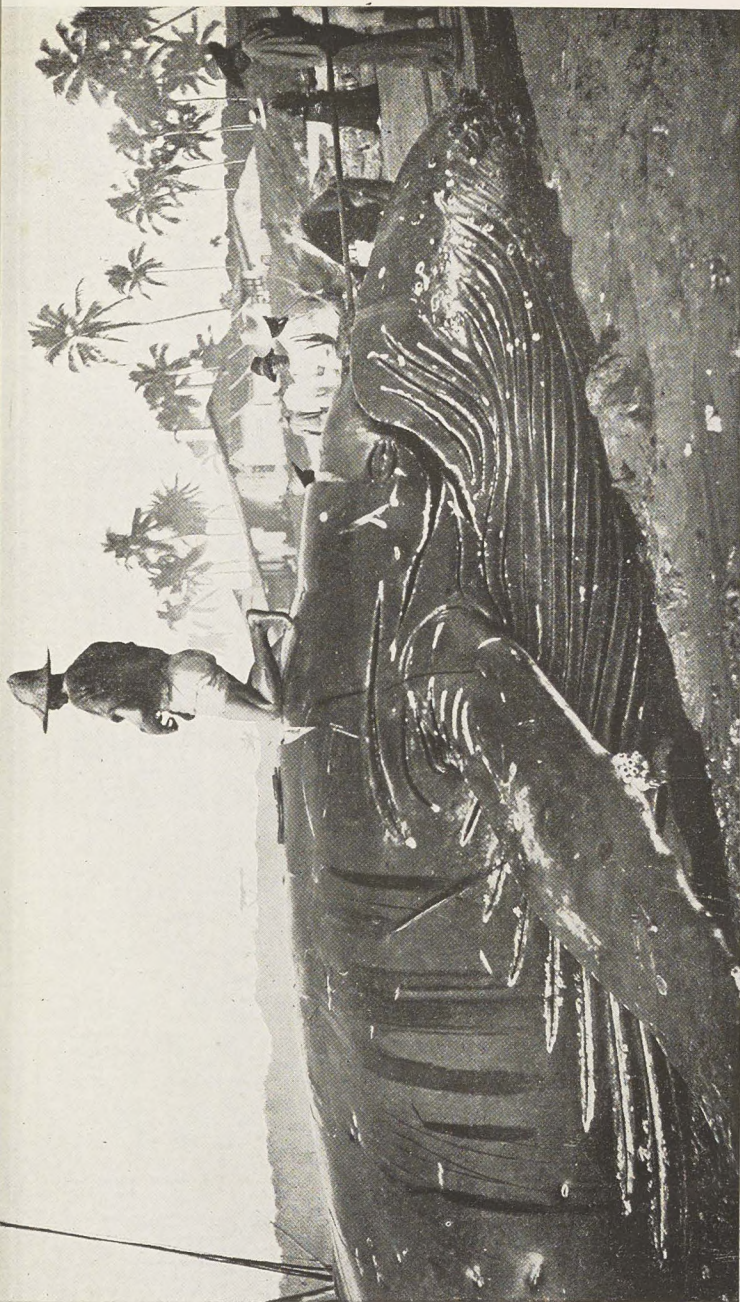
The heveas are true forest trees, reaching at times nearly 100 feet high, with a diameter of 15 to 39 inches. They are without branches for some three-fourths of their altitude. Most of the varieties producing the best and most abundant supplies of rubber are found growing in a humid situation, very frequently in alluvial soil periodically covered by the floods. They are, with the latter mentioned plants, found over an area of a million square miles. Some of them are capable of economic production up to an altitude of 950 feet. The rubber gatherers are hardly in the habit of discriminating between the various sorts, mixing the produce of many trees together, regardless of the quality of the gum. The riches of the valley of the Amazon are scarcely touched. It is sufficient to journey a few miles from the river banks to find virgin forests, and this over a distance of at least 1,000 leagues.

It is estimated that there are 52 companies in operation, with a total capital of £2,000,000. These have been

organised in the two years, 1906-07. A French traveller, Auguste Plane, who made serious studies of the Amazon basin, says that the production of rubber can be doubled whenever necessary, and as soon as the cost of living is decreased, prices of even $\frac{1}{3}$ or $\frac{1}{6}$ a lb. for rubber will prove sufficiently remunerative.

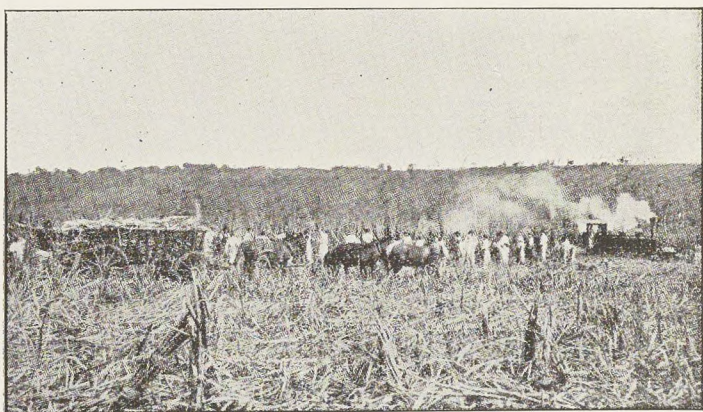
The tax on exported rubber, in Pará, varies from 15 to 25 per cent., according to the quality. The freights are proportionally high for river transport, never being less than $7\frac{1}{2}$ d. a kilogramme. In Manáos the various local taxes amount to 28 per cent. of the value when put on board, in addition to the Pará tax. Undoubtedly the result of such abominable fiscal measures is to encourage all kinds of abuses, and attempts at evasion. As the author of the "Monograph" in *O Brasil* says, such a state of affairs must not, and cannot continue. It means ruination to an exceedingly profitable and great industry. Referring to the other rubber producing plants, we find the tapurú, reaching 80 feet, and having an average diameter of three feet, with a feathery palm like top. The castilloa elastica is a much smaller tree, not exceeding 65 feet high, and 2 feet in diameter. The varieties of hancornia are relatively diminutive, about 10 feet high, and 2 to 3 feet in circumference. In São Paulo the plantations or forests are worked on the share system, the employee receiving usually a third part. The system employed is destructive, as both owner and worker concur in taking from the plant its entire store, not economising the sap in any way.

In Ceará, Piauí, and somewhat to the north and south, another variety is found, known as maniçoba. Contrary to the habit of the heveas, it is a native of the higher lands of the interior. The leaves are used to feed cattle. Tapioca is extracted from the roots, and the seeds



PREPARING TO CUT UP A WHALE (BAHIA).

By the courtesy of the Hon. H. W. Furniss, United States Minister to Haiti.



CUTTING AND TRANSPORTING SUGAR CANE.



A TOBACCO PLANTATION.

are in the form of almonds, and either in their natural state, or after the oil has been extracted, are a valuable food for cattle, pigs, and fowls. This tree is found as high as 1,000 metres above sea level, but its usual habitat is from 200 to 300 feet in altitude.

Many other entirely different classes of plants are rubber producing, including the wild fig. *Plumeria*, *sorveira*, *lucuma-laurifolia*, *platonina-insignis*, *symphonia-globuluris*, and *massaranduba* (*mimusops-elata*), a gigantic forest tree, whose timber is very valuable for constructive purposes.

EXPLOITATION OF RUBBER.

The concessionary, or owner of the seringaes rubber forests (or collection of trees producing rubber) is called the master seringueiro, or aviado. At the most convenient point he establishes a store (*barração*) where may be found every necessity and even luxury that man may require. We must presume that this aviado is a capitalist on a somewhat large scale. He may employ 200, 300 or even 500 men. Each man will be transported at the expense of the aviado to the forest, and will be advanced some £40 to £70 worth of different goods, including provisions, arms and munitions, medicines, and clothing. The aviado is in his turn exploited by the wholesale merchants (*aviadores*) of *Manáos* or *Pará*. Sometimes these latter give credit up to as much as £40,000. These latter are furnished with funds and goods by Yankee speculators, who receive payment in rubber at the end of the season. Each year some 20,000 collectors are employed, mainly from the States of *Ceará* or *Bahia*, and the rest are semi-civilised Indians, or natives of the rubber producing states themselves. Proceeding up the river in a launch, on arriving at the

selected points, each family lands, and whilst some of its members set up their encampment others proceed to blaze with a cutlass a line (or road) of rubber plants, up to 150 or 200 in number. This number of trees may cover a length of three or four miles, and no more can be properly tapped. Each line is made in a zigzag fashion in such a manner that the whole forms an oval, and the entrance and exit come together just where the seringueiro has established his smoking place.

His tools comprise : (1) A machette of soft iron to make the incisions (which are made obliquely, as high as possible).

(2) Balde, or pail, a vessel which will hold ten litres of latex.

(3) 700 to 800 tigelinhas (little basins) with a tube at one end to insert in the incision.

(4) A form round which the rubber is moulded.

(5) Boughão, or iron chimney, through whose orifice passes the smoke to coagulate the rubber.

(6) The bacia, or basin, which contains the latex.

The incisions are made early in the morning, and some four to six inches apart round the trunk, and the tigelinhas placed in each. Not more than $1\frac{1}{2}$ minutes is taken up at each tree. As soon as the whole of the trees are tapped he (or another) proceeds with the balde to draw off the contents of the basins (tigelinhas). Each line or set of trees generally yields from eight to ten litres of fluid (latex) daily, producing four to five kilos of pure dry rubber. The maximum amount given is about 15 to 18 litres. Care is (or should be) taken not to make too many incisions in a tree, and wise collectors stop up the

incisions when the latex is all collected, in order to protect the tree from insects.

The latex in the *bacia* is subjected to a temperature of 35° to 45° centigrade (95° to 113° Fahrenheit) to purify. Afterwards a fire is lit with the nuts of the urucury palm (*attalea excelsa*) which grows in the vicinity, or with others similar mixed with resinous woods. When a dense smoke is emitted the chimney is put over, and with the aid of a calabash (*cuia*) the collector places a quantity of latex on the mould. The handle of this is rested on the knees and a rotary motion is given to it whilst over the smoke.

The *bolacha* (biscuit) of rubber may weigh from five to 100 lbs., and is formed by continually adding fresh coats, as soon as one is dry. The average daily production of rubber is 12 to 25 lbs., and up to 40 lbs.

The collector, or *seringueiro*, commences work at five or six a.m., and is generally finished by noon. One man under good conditions should prepare 700 to 800 kilogrammes of rubber during the six months' season. An average is from 400 to 500 kilogrammes. At the time of writing the rubber is worth some 6/- a lb.

Presuming the *seringueiro* owes the *aviado* £80, and he is paid at the rate of some 4/- to 5/- a kilogramme for the rubber collected, some idea of his saving may be obtained. It is true that he pays nearly three times as much for his provisions as they cost the *aviado*, but the latter has to put up with every risk, including the dishonesty, or perhaps the death of the collector. The transport of one family to the Juruá will run into some £10 even under the most favourable circumstances.

Exportation of rubber from Pará—

1907-1908	10,189 tons	worth £2,209,375
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1908-1909	11,729 „	„ £3,176,625
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According to many authorities, if the price of Pará rubber should fall permanently, even to 2/6 per lb., so much demand would be made for it that all the areas under cultivation would still be well employed.

A Commercial Congress will be held at Manáos from the 22nd to the 27th of February this year, 1910, when most of the rubber producing countries will be represented, and an exhibition held, and prizes offered for various essays on the subject of rubber cultivation, collection and preparation.

In Matto Grosso the manner of collecting is on somewhat similar lines to Amazonas, but the aviado is here called abonado, and he sends out his men in groups under a foreman, and the forests are reached as a rule in about two weeks, the journey being made on foot in daily marches of some 18 or 20 miles. Each man bears with him a small figure of his patron saint, for luck, and woe betide the fetish if dame fortune does not smile on the bearer. The poor saint is either burnt, hung or chopped up, and another protector chosen. A strange superstition exists that a stolen mascot brings great luck to the stealer, and misfortune to the former owner.

In this state the rubber (latex) is treated with a solution of alum, boiling hot, and as soon as it is coagulated the mass is subjected to great pressure, and the rubber resulting is in the form of cakes, some 30 inches long by 6 inches wide, and weighing up to 50-55 lbs. Best quality is worth some 10s. a kilogramme; 2nd, 7s. 6d.; and mangabeira, 4s. 6d. to 6s. a kilogramme.

PLANTS PRODUCING TANNIN.

The following are the principal sources of extractives used for tannin purposes in Brazil :

	Percentage of Tannin.
Stripnodendron barbatimão	25 to 48
Acacia angico (bark and fruit)	40
Phyzophora mangle (bark and leaves)	20 to 30
Buranhem	30
Murici guassú	15 to 20
Quebracho vermelha (red)	4 to 16
Ingá sapida, edulis, vera, dulcis	10 to 15
Acacia jurema	8 to 15
Quebracho branco (white)	12
Carapa vermelha	4
Compared with oak (in Europe)	30 to 45

Many plants used in Europe do not possess more than 8 per cent. of tannin.

The barbatimão is the most generally used in Brazil, and furnishes also fine woods for the cabinet maker. In the States of Minas, São Paulo, and Rio Janeiro this bark is extensively employed ; but in São Paulo, where there are more than 50 tanneries, the local supply is insufficient, owing to the devastation of the forest. This applies, more or less, to the other two states, but especially to Rio de Janeiro, where the extraordinary clearances have made a great difference in the wet seasons, the rainy weather coming now, quite out of the usual time, and in volume generally less than heretofore. Many tanneries have had to close down in different parts of Brazil, owing to lack both of hides and tanning

material. With improved methods, and great increase in stock of store cattle, this is not likely to occur in the future.

With the barbatimão, some seven or nine months treatment are necessary. The usual price in the State of Minas Geraes is about 1/6 per arroba (15 kilos), or about 32 lbs. There are also five other species of stryphnodendron used in Brazil. Exportation has commenced of various barks to Europe (Germany and Portugal) from Paraná, Rio Grande do Sul, and São Paulo. The embaúba (*cecropia-palmata*), etc., whose tender leaves are the favourite food of the sloth, furnishes also a large percentage of tannin, as well as being very useful in the manufacture of cordage. The number of plants used in Brazil for tanning is so great that it has been found impossible to quote more than the principal, and most widely used ones.

FIBRE PRODUCING PLANTS.

Undoubtedly one of the greatest sources of wealth in the Republic; it is as yet, perhaps, the least exploited. Everywhere there are myriads of malvaceas, and, doubtless, Brazil is the country richest in the branches of this family.

In comparison with the canhamo (hemp) it is considered that the guaxima vermelha would rival the former, if properly prepared. Many of these latter plants have been used in making ship's cables in Brazil, since colonial days. The urena and the triumpheta are used under the name of aramina.

These plants, in favourable situations, not too dry, produce fibres of eight to nine feet in length. In São Paulo some 12,500 acres are under cultivation, and pro-

duce about 800 tons of fibre annually. Nearly the whole is consumed by one factory in the capital of the state. The usual price paid is, rough 2d. per lb., and prepared 6d. to 8d. a lb. The cultivation is carried on near the coast, and some 60 quarts of seed are used to the hectare ($2\frac{1}{2}$ acres). The harvest commences in February, and ends in June or July. The principal use of the fibre is in the production of sacking for coffee, 60,000 to 70,000 bags being made monthly.

A group of the malvaceas, known as vassouras, is so persistent and universal in its growth that, if Brazil possessed a department similar to that in the Australian Colonies, they would become *proclaimed plants*. They are, however, very useful, the more delicate fibres making good paper, and the others furnishing material for brushes, ropes, and twines. This family is allied to that of the jute. The one kind that is likely to prove of most value is known as canhamo brasiliensis (Brazilian hemp). Very similar to our own flax, it is now known locally by the name of linho *Perini*, from the name of its supposed discoverer. It grows in the valley of the river São Francisco principally, in some places in great profusion, and also in the States of Minas and São Paulo. It appears to be a variety of hibiscus. The stalk grows to the length of 10 to 13 feet, without branches. The strength of the fibre, as compared to hemp, is about four to three. Cultivation on a large scale has been commenced at Rodeio, in the State of Rio. Production of 1,000,000 square metres of land, three crops yearly, 380 tons of best quality, and 2,214 tons of second quality fibre. Prices offered in Europe £40 and £12 respectively, per ton.

Some 2,500,000 square yards have been planted with the fibre. Each acre produces at present 3,194 lbs.

The earnings per acre run up to £60. Experiments have been made in growing elsewhere (Texas) but no information is forthcoming as to commercial results.

The family of bromeliaceas present also varieties of pineapples, suitable for textile fibres. The north of the State of Rio, along the coast, is covered with this (*bromelia lagenaria*) type for 60 square kilometres. The exploitation of this plant is purely local, in spite of the great opening in Europe for the fibre. A London house offered £30 a ton, and asked for an immediate lot of four tons for experimental purposes. Price offered at Hamburg was £15 a ton.

In the family of amaryllidaceas we must note the *fourcroya gigantea* and *fourcroya cubensis* (pita).

Both these plants are common in Brazil, and may be found at all altitudes. Length of leaves, 10 to 12 feet.

Compared with sisal, the following figures demonstrate the value of this plant :—

Dimensions of leaf.	Weight.
Sisal, 4 to 6 ft. × 4 or 5 in.	1½ to 2 lbs.
Piteira, 8 ft. × 7 to 9 in.	3 lbs.
Weight, 1,000 leaves.	Fibre, 1,000 leaves.
Sisal, 1,500 to 2,000 lbs.	50 lbs.
Piteira, 2,500 lbs.	50 lbs.

The sisal lives 10 to 12 years, the piteira, 12 to 16 years.

Pita requires three years to mature. The minimum yield per acre is 1,500 lbs. of fibre, worth £13. An estate of 1,000 acres (400 hectares) would produce

£13,000 after three years. Expenses calculated in planting 5,000 acres, machinery, freight, etc. £1,200

Wages, etc. (4 years)	10,000
Instalment, etc.	1,800
Depreciation, etc.	100
Freight, etc.	6,000

£20,000

Expenses, first 4 years	£20,000
Result (one crop)	60,000

Profit £40,000

If we add £5,000 to expenses, and allow no crop in the fourth year, we have then—

Five years' expenses	£27,500
One crop, result	60,000

Profit £32,500

Calculating £20 per ton, and a minimum crop of 3,000 tons per 5,000 acres.

Experts calculate the crop, after three years, at £13 per acre, thus 5,000 acres = £65,000.

An ample margin is thus shown, and land is not wanting for planting. If we reckon value of land at 5/- an acre it will be an outside estimate.

In 1904 the price of pita (Mauritius hemp) was from £25 to £35 a ton (London).

The exportation of cocoa fibre, etc., is very far from being equal to the demand. The total amount in vegetable fibres, in 1905, coming to 7,377 kilos (less than 7½ tons), valued at about £300.

Kapok (paina) is another vegetable substance which is produced in Brazil, from the fruit of the various families

of paineras. The best quality paina branca (white) is capable when used in life-belts, of supporting 30 to 31 times its weight, as compared with the kapok from Java, 26 to 28 times its weight. The painera is abundant in the States of Espirito Santo, Rio de Janeiro, Minas, São Paulo, etc. In spite of the excellence of the production of this class of tree, the exportation is infinitesimal. Most of the paina is used in Brazil in stuffing mattresses, pillows, cushions, etc.

ARAMINA.

This fibre is used by the Sack Manufacturing Company in São Paulo, which has a monopoly, and uses some 350,000 kilogrammes of fibre annually, making some 800,000 sacks.

RAMIE FIBRE.

Up to the present this is not cultivated, but the Government has resolved to plant it wherever possible in the new colonies.

PIASSAVA FIBRE.

Piassava (*attalea funifera*) yielding the fibre from which brooms, brushes, etc., are made (as well as the coquilho nut), is found growing wild in Bahia, mostly along the coast, and in the south. It is a kind of palm, with just a cluster of tall leaves, growing in a sandy soil. Forests contain to an acre, as a rule about 75 trees, which produce generally from 10 to 20 lbs. of fibre each annually. Several estates are very large, and one company has 450,000 acres under operation containing 6,000,000 palms. A large quantity of the fibre is from State territory, exploited under Government concessions, the price usually payable per arroba (15 kilogrammes) extracted, being fixed by the state. An export duty of 21 per cent. is

levied, and from July to December, 1908, this tax brought in some 300\$000 per ton. In this year 1,318 tons were exported. Land is worth from 4s. to 8s. an acre, and labour costs two to three milreis per arroba. The British Company owning the above large estate north of Bahia uses modern machinery, but the native companies do all the work by hand.

RELATIVE STRENGTH OF FIBRES.

m/m=millimetres.	Diameter of cord (dry).			Diameter of cord (wet).		
	1'5 m/m	2'5 m/m	3'5 m/m	1'5 m/m	2'5 m/m	3'5 m/m
Aramina (Urena Lobata) ..	14'0	24'0	—	—	—	—
Canhamo Perini (Hibiscus uni- dens) (prepared by Dr. Perini)	10'2	20'5	—	11'7	22'5	—
Prepared by the Agricultural Institute	9'5	18'2	—	15'7	22'7	—
Sisal (Pernambuco) (Agave vivipara)	14'5	22'5	25'0	—	—	—
(Manilla) Canhamo (Cannabis indica)	7'0	15'5	31'5	22'5	27'0	68'5
(Madagascar) Raffia	12'5	24'0	27'5	17'0	27'0	34'0

Greater strength when wet is due to the contraction of the cord, and consequent shortening of it.

BANANA.

Unexploited in Brazil for the purpose of textile fibres. São Paulo could produce not less than 80,000 tons of these fibres per annum.

The above are only a few of the plants which occur in profusion all over the Republic, and offer a hundred different kinds of utilities to the world of commerce.

The thing which is most astounding is not the extraordinary richness of the vegetable kingdom in Brazil, but the meagre way in which these sources of wealth are utilised. Fortune awaits any capitalist who will venture to take up the study of any one of a thousand different kinds of cultivation, or even the commercial exploitation of those multitudinous species growing wild in every state, from one end of the Republic to the other. The very cursory glance given in the previous pages to this subject is entirely inadequate to give the reader any idea of the wealth nature has so bounteously bestowed upon this fair land, only now beginning to take its proper place amongst the productive countries of the world.

CHAPTER XI.

Timber, etc.

BRAZIL is undoubtedly the country possessing the richest store of valuable woods. The majority are so hard that furniture made from them resists the worm. Many possess perfumes as aromatic as any invented by modern science. In spite of the wonderful exuberance of nature, especially in the north, and the unequalled fluvial system of those most favoured states, the melancholy fact must be confessed that it does not pay to export any but the finest timber. Not only this, but as yet an enormous quantity of pine is introduced into the country for the purpose of box and case making, general carpentry work and building construction. This is the case even at Belem (Pará), where the forest is at the gate of the city. The explanation of this lies in the fact that freights are prohibitive, a cargo sent to Liverpool hardly paying cost of transit, and that the more beautiful forest trees are growing isolated. One finds, in a great wood, a hundred different kinds of huge and stately trunks, hardly two alike in proximity. The all pervading quest of rubber renders labour unavailable, and again some of the timber is so hard that it resembles iron rather than wood. The future of such trees as the massarandubá is in the hands of the railway constructor, the enduring qualities of the wood making it very useful indeed for sleepers.

The so-called cedar of Brazil (*cedrela odorata*) is found throughout the Amazon region, and is principally used in cabinet work, and internal fittings of houses.

The jacarandá (*pallisander*), mahogany and ebony are the woods most commonly used in local furniture and cabinet making. For exportation, the former, of the best quality from 18 to 25 inches in diameter, and from 12 to 14 feet in length, weighing over 800 kilogrammes, is worth in Havre 600 francs.

Peroba, vinhatico, ipé, canella, piuna, and such names can convey no information whatever to the ordinary reader, but some of the woods are so fine that they fetch (locally) as much as £5, £6 and £7 the cubic metre.

The only exportation from the north in 1906 was as follows:—From Manáos, £5,800, and from Pará, £9,900, this latter paying in exportation taxes £567. The two woods predominating were the acapú and pau amarella (yellow wood), for flooring purposes, as the dark and light colours alternating are very pleasing to the eye. Many of the finest houses in Lisbon are floored with these woods.

Exportation (total)

1907	...	...	£17,402
1908	...	...	£43,070

In Paraná most of the owners of pine forests have entered into an accord to raise the price.

The monopoly created at the great European market (Hamburg) is considered to be one of the principal causes of the failure to develop the timber trade. It is stated that a closed ring of buyers fix the prices paid to the exporting firms and then deal for whatever is needed amongst themselves. The greatest consumers of timber

are the Brazilian railway companies and the sugar mills. Two lines in São Paulo alone burnt wood to the value (locally) of nearly £100,000, in the year 1904. Some idea of the extraordinary state of affairs in Brazil may be gathered from the fact that in the capital of the Republic it is sometimes cheaper to buy coal imported from England than wood, which is to be found within a couple of leagues of the metropolis. In the vicinity of the city it has been found necessary, not only to prohibit the destruction of the forests, but also to form reserves, and plant some of the most useful sorts of the nearly two thousand varieties of trees indigenous to Brazil.

In the State of São Paulo a veritable marvel of the vegetable kingdom has been discovered, in the shape of a tree with luminous foliage showing a magnificent spectacle of phosphorescence at night.

NUTS, OILS, WAX, ETC.

The castor oil plant, although not indigenous to Brazil, has adapted itself locally with great success. In spite of the most rigorous methods taken to extirpate it, including fire, once introduced into a district it is never destroyed, and is considered as a plague. Largely used for many years as an illuminant, it is employed more and more as a machine oil, mixed with other oleos, or alone. The Leopoldina Railway Company has established a factory for the purpose of extracting the oil as a lubricant. There are some 12 or 13 more mills distributed over the different Brazilian States. Several other plants of the same family are common in the country.

Copaifera officinalis (copaiba). There are 20 species of this family of leguminosae, of which some seven are found in Brazil. The oil is extracted from the trunks by means of an incision, and in Bahia a suction pump is

employed. The limitation of the tree is about 20 quarts. The principal places of export are Bahia, Maranhão, Pará, and Manáos, and the largest importing countries are the United States, Great Britain and Germany.

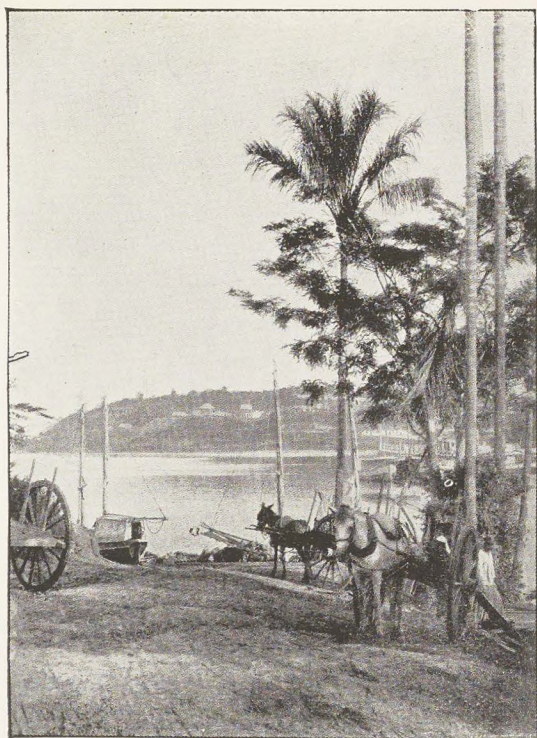
Brazil nut oil, furnished by the Brazil nut of commerce, and kindred seeds. Contrary to many of the trees of the Amazonian region, the chestnut (as it is called in Brazil) grows best on high and dry lands, and forms extensive woods of lofty trees of great size, attaining the height of 150 feet, and having a girth of 12 to 20 feet at 50 feet up. The nuts are contained in a shell about the size of a cocoanut. Those called sapucaias, produce a fruit excelling the Brazil nut in quality, and worth two or three times the former. The State of Pará has almost a monopoly in the exportation of the Brazil nut. The extraction of the oil is generally performed locally, for use in the country. The whole of the woods are uncultivated, and the collection of the nuts is fraught with great difficulty.

These are found in the silvas, or elevated plains, and each shell contains some 15 to 20 nuts arranged somewhat like the sections of an orange. The outer pod is so strong that a loaded cart could pass over it without cracking the shell. The trees are too high to climb, so only those pods which fall to the ground are collected.

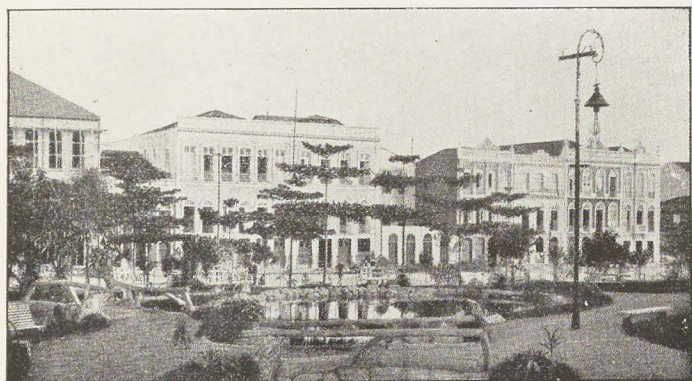
The retail price of the new crop has advanced steadily during the last ten years from 4d. to 6d. and 8d. per lb.

This nut contains some 17 per cent. of protime, and 66.8 of fat, and only 5.3 per cent. of water, comparing very favourably with other foods from an alimentary point of view.

The sapucaias are quoted now from 1/6 to 2/6 per lb. This class of nut is found in a pod, bearing a closely fitting lid, which, when the nuts are ripe, opens and lets



THE RIO NEGRO (NEAR MANÁOS) AMAZONAS.



MANÁOS, PUBLIC GARDENS.



ZEBUS.
(Indian type of Oxen).



THE MATTE HARVEST,
A Deposit (Paraná).

fall the contents. Monkeys are unfortunately very fond of these, consequently the crop is small.

Exportation of Brazil nuts from Pará—

1907-8	80,255 hectolitres	£132,110
1908-9	80,797 „	£70,100

Carnaubeira (*copernica-cerifera*) is found as far south as Bahia, and grows sparsely in the more temperate parts of Brazil, thriving best in hot, dry situations.

Of this palm, Humboldt speaks as the tree of life, and its wonderful utility may well entitle it to lay claim to that designation. The roots are useful in skin diseases as depuratives, the leaves make excellent cordage and twine, and are commonly employed to stuff mattresses and pillows; the fruit is agreeable and nutritious, the timber makes fine furniture, taking a high polish, and resists putrefaction so well that it is in use in a hundred different ways in salt and fresh water. The young shoots are the palmito or cabbage palm, the sap of the adult, palm contains a very wholesome kind of tapiocá, and makes a pleasant fermented drink, whilst even the stalks and other residues furnish food for cattle. The principal product of the tree is, however, the vegetable wax, which is found in the young leaves. 100 leaves from one tree give about 4 lbs. of wax on an average, but under good conditions, as much as 13 lbs. has been obtained. The value, per kilogramme, is about 2/- (1905). The exportation of this wax, the same year, was valued at less than £200,000.

Cocoanut palm. In its green state the nut contains more than a pint of liquid. The substance, in a gelatinous state, is highly considered in Bahia, and should be much better known in Europe than it is. The nuts, which are so common and cheap in the English markets, are in comparison with the green ones, not at all palatable.

The production on the spot of cocoanut butter, fibre and oil seems to be needed, and the enormous quantity of plantations existing might find a ready market for their nuts. As it is, freights are so high, and consumption so small, that a cocoanut costs twice as much in Rio de Janeiro as it does in London. The value of each nut on the spot (Pernambuco or Bahia) is about 1½d.

COQUILHO NUTS.

Produced by the piassava palm (see Fibras) and grow in a cluster of about 100 at its base. Each nut is about the size of a turkey's egg, and contains a large kernel, which produces a very fine lubricating oil. The nut itself is generally used for making beads, buttons, and other small articles. The Government levies an export duty of eight per cent. on this product, working out at 100\$000 per ton. During 1908, 429 tons were exported.

MATTE (ILEX PARAGUAYIENSIS).

Matte is to the Southern Republics, Chili, Paraguay, Brazil, Uruguay, and Argentine, what tea is to the European. It is even more drunk in many places than its rival, coffee. Here we find a plant which has its habitat exclusively in the temperate region, at an altitude of from 1,500 to 3,000 feet above sea level. Its Latin name is, of course, due to its being found, probably, in the first instance, in Paraguay, but the State of Paraná is the great seat of its exportation.

The tree, or rather bush, is some 12 to 20 feet in height, and it rarely reaches 30 feet. It belongs to the hollies, but is without spinous leaves. The area over which it is distributed in Paraná alone is some 140,000 square kilometres, but it is found in six other states, as well as in a small part of Argentina and Uruguay, near the Brazilian

frontier. The leaves are prepared in two distinct ways. (1) Ground up into powder to be used in the *cuia* (or gourd), and the decoction, made with boiling water, is sucked up through a perforated tube. (2) Prepared as a sort of tea in flakes, with some fine stalks, and taken in cups, like the Chinese or Japanese liquor. The infusion is of a green colour, and when brewed in a pot, the Brazilian custom is to put a piece of glowing charcoal into it. The effect is to turn the liquor into a dark brownish green, and undoubtedly much stronger. It improves also by boiling. *Matte* has one great advantage over tea, and that is, that two brewings may be made with the same handful of *herva*, and sometimes the second is stronger than the first. Its greatest quality is in its effect on the human system. Take a good bowl with a crust of bread at 4 a.m., and you may work in the harvest field till noon. It has no aftermath, no injurious influence on the digestive organs, and its action is stomachic and laxative. During the war with Paraguay the soldiers marched and fought day after day without any food but *matte*.

I have noticed a remarkable fact with relation to its medicinal properties. In the Argentine cattle lands, an enormous quantity of meat is consumed, indeed, the staple diet of the people is flesh. I have myself breakfasted on huge beefsteaks for months together, seven days a week. The beef, however, goes together with the *matte*, usually a *bombilla* (in the *cuia* or gourd). The *bombilla* is the tube, spoon-shaped at base, and commonly of silver, through which the *matte* is drawn.

The cowboys are great beef eaters, but rarely suffer from the effects of the diet. Certainly the *matte* is a blood purifier, at least taken in native fashion, and without sugar. This beneficent herb can be placed on

the market here in England for 9d. a pound, and if imported direct in large quantities would cost no more than 6d. per lb.

Compared with tea or coffee the analysis is calculated as follows:

Component Parts 1,000.	Green Tea.	Black Tea.	Coffee.	Matte.
Essential Oil	7'90	6'00	0'41	0'01
Chlorophylla	22'20	18'14	13'66	62'00
Resin	22'20	36'40	13'66	20'69
Tannin	178'00	128'80	16'39	12'28
Alcaloids, theine, caffein ...	4'50	4'30	2'66	2'50
Extractives	464'00	390'00	270'67	238'83
Cellulose and fibres	175'80	283'20	178'83	180'00
Ashes	85'60	25'61	25'61	38'11

Matte is a tonic, a nutrient, stimulant, and diuretic, and according to a medical opinion, a febrifuge, capable of preventing intermittent attacks. It is in all cases an excellent beverage to quench the thirst of sick persons. It stimulates the nervous system so gently that no ill effects are caused. It is eminently the beverage for all. The brain worker or the field labourer, the soldier or the miner. The verdict of science is unanimous in its favour, yet it is almost unknown in England as yet, being sold at extortionate prices by quacks and other exploiters of the ignorant.

The Spanish army, during its recent campaign in Morocco, found the use of matte magical in its effects on troops on the march.

A chemist of Kostvitz, in Saxony, has now produced a gaseous beverage which somewhat resembles beer in its

flavour, but, of course, without the alcoholic properties of the malt liquor.

To purify water, an infusion of matte is a most excellent thing, causing precipitation of lime rapidly when the water is impregnated with calcareous matter.

TO REPLACE TEA OR COFFEE.

Two grammes of matte to one cup of water (or roughly speaking a handful) of the herb serves for a quart. Costing 1/- a lb. each quart of matte would amount to 1/10th of a penny.

A very good drink may be made from two grammes of matte and $\frac{1}{2}$ a gramme of centaury tops to $1\frac{1}{2}$ quarts of boiling water.

EXPORTS.

1907, 52,053 metric tons of 1,000 kilogrammes,	£1,601,187
1908, 55,315 " " "	£1,648,625

Each bush produces some 200 lbs. of leaf and fine stalk, which is reduced in the factory to about 90 lbs. of herb. In its natural state the matte is found in company with the monarch of the temperate zone of Brazil, the majestic and graceful araucaria (the southern pine). The only cultivation the bush receives, under these circumstances, is periodical clearing the obstructing growths from its vicinity. This is done every two or three years, under favourable circumstances. The harvest is collected from May until August. The branches measuring less than half inch in diameter are nearly all cut down, and then the finer twigs and leaves separated from the mass. The leaves are then submitted to the action of a quick fire for a moment, and afterwards prepared in the factories, and packed in barrels for export. The tea is also sent out in packets and tins, principally to Montevideo,

Buenos Aires, and to Chili. Exportation during the last quarter of a century has increased at least 300 per cent. The most encouraging thing about this trade is its development without artificial aid, solely through the excellence of the article. The annual consumption in the State of Paraná, per head of the population, is about 10 lbs. The exterior trade is carried on through 14 ports, in six different states, but of the total, Paranaguá and Antonina between them account for more than one half. It is calculated that the bush requires three years before being fit for harvest again, if the precaution is taken of leaving a few branches, covered with leaves at the top, to protect the rest from the elements. The price of the tea put on board transatlantic steamers, works out at about 3d. a pound, and some allowance must be made for trans-shipment, for the German liners calling at the Paraná ports do not touch at a British one en route to Hamburg. The price stated previously, 9d. a pound, will cover all costs of delivery (retail).

MEDICINAL PLANTS, ETC., ETC.

Quinas, furnishing cinchona, or Peruvian bark. There are no less than 14 or 15 native kinds, and the true Peruvian cinchona has been introduced with great success. Angelica, quassia, gentian, centaury, rue, and many purely Brazilian species of bitter tonical plants abound in all the states.

Ipecacuanha is found very largely in the State of Matto Grosso. The collectors take up and dry the roots, observing that one is left to propagate wherever a plant is found. The price (in Brazil) is about £1 per kilogramme.

Tonic stimulants. The principal one (matte) has already been described.

Depuratives. Salsaparilla is the best known and widest distributed, many rivers having their water impregnated with it. Amongst others of the 30,000 Brazilian plants may be mentioned the capsicum, mimosa, cashew, ipecacuanha, many violaceæ, convolvuli, jalap, lyrios, sorghum, urtigas, jaborandi, etc.

ORNAMENTAL PLANTS.

Orchids naturally take pride of place amongst the above, Brazil occupying the chief position in the world with 1,059 varieties, most having large and beautiful flowers.

Of the cattleyas Pernambuco exports *labiata*, *leopoldii* *guttata* and *granulosa*. Other species of orchids from this state are the *burlingtonia fragrans*, *oncidium devaricatum*, *oncidium gravesianum*, and the *miltonia spectabilis moreliana*.

The cattleya *labiata alba* is also found, with an exquisite white blossom, but it is extremely rare.

Plants with eight leaves are worth 4½d., those with 15 leaves 9d., 20 to 30 leaves 1/4, and 30 to 40 leaves 1/11 each. An extraordinary plant was found recently and sold for £1. In the United States or Europe it should be worth £30 at least. When in full bloom it is expected to bear 500 flowers.

Buyers representing great growers take up their abode at a central spot, and give notice of their intention of buying. Every market day the people come in with some plants, good, bad, or indifferent. Pernambuco exported 15,000 of the cattleya *labiata* last season. An export duty of two milreis per 100 plants is charged. Properly packed they will stand 30 to 40 days' voyage.

The cattleyas and *lælias* are found principally from Bahia southwards, in the coastal ranges.

Pará exports mostly the *C. eldorada*, *C. superba* and *oncidium lanceanum*.

Bahia—*C. aclandii*, *C. ameythst oglobossa*.

Espirito Santo—*C. labiata*, *C. harrissonia*, *C. schofieldiana*, *C. schileriana*, *C. crispa*, *lœlia-xantina*, *L. tenebrosa*.

Rio de Janeiro—*Lœlia perrinii*, *C. harrissonia*, *C. crispa*, *C. lobata*, *C. guttata* and *miltonias*.

Minas and São Paulo—The same classes.

Santa Catharina — *Lœlia-purpurata*, *lœlia-elegans*, *C. intermedia*, *C. leolpoldü*.

Espirito Santo and Santa Catharina boast of the rarest varieties of these beautiful plants, some, as the *cattleya autumnalis alba*, being worth £50, or the *C. warnerii* £200. Amongst the other noteworthy plants are the *begonias*, *cannas*, *almonds*, *cardamum lilies*, *hortensias*, *magnolias*, *verbenas*, *jasmines*, *lycopodiums*, *bougainvilleas*, *camelias*, *victoria regia*, *waterlily*, *heliconias*, *amaranths*, and all flowers common to Europe, besides others without number. The plateaux at an altitude of some 6,000, 7,000 feet which are found in several places in the States of Minas and Rio de Janeiro, are remarkable for a flora of a distinct nature, amongst which bulbous plants predominate, growing very frequently with the roots almost entirely exposed. In these elevated regions, the climate is truly temperate, and most of the flowers are found blooming in the spring or early summer. The *fuchsia*, which is a sort of climbing semi-parasite in southern Brazil, is not found much above 3,000 feet, but between 2,600 and 2,900 feet is abundant in most places.

ESSENCES, RESINS AND DYES, ETC.

The quebracho colorado of Argentina is replaced in Brazil by several trees of the Brazil wood type. Some dozen or more producing a red dye, including three kinds of dragon's blood trees.

Two anils with fine blue colours, both creepers (*cissus tinctoria* and *cissus sicyoides*) also the indigo plant itself.

Some of the fuchsias give a black, and other trees, as the ludwigia - caparosa and various bromeliaceas, a brilliant yellow. Gum arabic is obtained from acacias, cashews, etc., and copal from hymenæas. Resins are produced from the amyris-clemifera and the hedwigia balsamifera. Of the essences the vanilla plant is found nearly all over Brazil, especially in Minas Geraes. Cinamon grows exceedingly well in Pará and Maranhão, and the famous tonkin beans are common in the northern forests. Neither of these two latter plants have been cultivated to any extent, although the States of São Paulo and Paraná have made attempts, under Government supervision, to produce vanilla on a commercial scale; and the latter state has published directions for its successful culture. It may safely be asserted that there are many plants producing extremely valuable essential oils and extracts, that would repay a hundred fold the man who took up their cultivation in a scientific way. It is just the things which are neglected that offer the best openings in Brazil. Undoubtedly the state most advanced in agronomical studies is São Paulo, possessing as it does at least two finely equipped and managed experimental stations. Here also meteorological phenomena are adequately registered, and the results profited by. The Paulistas term themselves, perhaps with some justice, the Yankees of Brazil.

CHAPTER XII.

Agriculture—Part 1.

Coffee, Sugar, Cotton, Cocoa, Tobacco.

COFFEE.

COFFEE is grown in Brazil, principally in São Paulo, Minas Geraes, Rio de Janeiro and Espirito Santo. The plants flower from September to December; earlier in the north, and later in the south. The crops are gathered from April to July or August, or during the dry season.

Although many parts of the more central states (coastal) are adapted by nature to the growth of this plant, the fazendas have been reduced to less than half their previous extent, owing to the state of the European market. The soil of the coffee producing zone is of a red colour, and is presumed to be similar to the Devonian in England. Sember says that it is formed of decomposed lavas mixed with decayed vegetable growths. The element that seems lacking in most of the soil appears to

be the oxide of cal (or lime), this, however, does not appear to prejudice the coffee plant, as it requires but a fourth part of this chemical constituent as compared with wheat. Experiments carried out with samples of earth from Minas, Rio de Janeiro and São Paulo, demonstrate that the composition shown by analysis does not agree by any means with the result obtained by harvest; after all the most exact method of proving the suitability of the soil. The data that one finds infallible in cold ground in Europe, are hopelessly at fault in the cultivated zones of Brazil. Whilst in England one finds a maximum depth of soil of some 24 inches, in relation to efficacious agriculture, in São Paulo there is from three to five times as great a profundity. I have myself seen a solid wall of earth at least 150 feet high, and decomposition is said to have been effected in many localities to the depth of 1,000 feet. All scientific travellers in Brazil remark this extraordinary phenomena.

With regard to the selection of seeds for the propagation of coffee, the greatest care is taken now-a-days. From 75 to 90 per cent. of those planted survive. The sites selected are generally cleared as soon as the summer rains have diminished, or ceased, at about the end of March. The fallen trunks and branches are left to dry until August, when the whole is set on fire. At the beginning of the wet season the young plants (previously brought up from seed) are selected and put in. The planting continues from November to February. The first crop is produced in the third year, and the system employed in São Paulo for the new plantations is sufficiently favourable to the colonist. By Decree No. 1,090 of 9th of January, 1903, the situation of the planter became more untenable, and the Valorisation Scheme was proposed as a remedy. This as we have seen is

superseded, 1908. Generally speaking, the new arrival (immigrant) has a definite contract with his employer, and his salary or share of profits is the first charge on an estate. He finds a house built, and a lot for his own use, already cleared. Between May and September he can earn 5d. to 7d. a half sack (or one and a half bushels), picking the berries, and in the case of a large family, the earnings are quite substantial. Many Italians being able to return home for three or four months each year. Another method is to pay for each 1,000 plants tended, or hoed round, from £1 to £1 5s. This operation is performed some five times in the year. Ample time is left to the colonist to cultivate his own lot, for which he pays no rent whatever, neither does he for the house. Some of the planters adopt a different system, paying a third of the production to the colonist, and advancing him means for his subsistence until after harvest. The cost of marketing fifty kilos of coffee works out at about the same number of francs, or with interest on capital and depreciation reaching 66 francs for a fair grade of berry. This amounts to 6d. per pound in round figures. From 1890 to 1895 coffee reached the high water mark of 97 francs, and once or twice even 130 francs. The lowest point touched (1900-1905) was 40 francs. Whilst the present state of affairs continues the virgin lands in the State of São Paulo alone (some 2,500,000 acres) must be reserved for other kinds of cultivation. Various measures have been taken by the planters themselves, including the burning of immense stocks of coffee. One great grievance the planter has, is the fact that his best efforts to produce a high grade of berry bring profit, now and then, not to him, but to the European merchant, who buys at the lowest figure, and sells the Brazilian production at the price, and under the name

of Mocha or finest Java. I asked recently the manager of a large wholesale house, what stock of Brazilian coffee he carried, and the reply was—*none*. One can only judge that he didn't know what he was selling. The diagram below represents the estimated world's crop 1908-9, and speaks for itself. That of 1906-7 was the greatest on record, totalling 15,392,000 bags from Santos alone, and 4,234,000 from Rio de Janeiro.

A fazenda, or coffee estate of 50,000 trees in good condition, is worth some £5,000. These 50,000 plants should produce 240,000 lbs. of coffee.

Many different kinds of vegetable crops may be grown between the bushes. On the higher lands (up to 5,000 feet), protection from the cold winds is frequently required.

**SÃO PAULO
(SANTOS),**
9,533,000 bags.

COFFEE EXPORTATION

FOR THE YEAR 1908-09.

IN BAGS OF 60 KILOS.

Each bag in the diagram represents 50,000.



RIO,
2,883,000
bags.



**BAHIA
and
VICTORIA,**
496,000
bags.



BRAZIL.

CENTRAL AMERICA,
Mexico, Guatemala,

Honduras,
S. Salvador,
Nicaragua,
Costa Rica,
etc.,
2,140,000
bags.



Venezuela,
Colombia,
Ecuador,
and Peru,
835,000
bags.



Dutch Indies,
Java, etc.,
British India,
and
Manilla.
445,000
bags.



Cuba, Porto-Rica,
West Indies,
Africa, etc.
290,000
bags.

Haiti,
295,000
bags.



OTHER COUNTRIES.

In addition to the three francs surtax on each bag of coffee imposed for a period of six years by the Convention of Taubaté (São Paulo), signed by the Presidents of São Paulo, Minas, and Rio in 1906, the Government endeavours to prevent the exportation of inferior grades of coffee, and has entered into contracts with companies in England and elsewhere to further the consumption. São Paulo has some six hundred million coffee plants, representing four francs or $3\frac{1}{2}$ per plant. Each 50 kilos requires some 70 plants. Thus to produce 1,000,000 sacks of 60 kilos each, a capital is necessary of no less than £13,430,000. The total sum invested in the business in this one state must amount to £100,000,000 at the present time. The probability is that São Paulo will follow the example presented in England by the hop growing countries, indeed polyculture has been the care of the agricultural department for some years past, and the tendency is to supplant coffee with more profitable growths. A remarkable fact is presented to the student of economics. In spite of the high prices ruling in the nineties, Brazil was the only country to materially increase its production, rising from five million sacks in 1880, to $8\frac{3}{4}$ million sacks in 1900, and 12 millions in 1905, whilst the total output of the rest of the world decreased from $4\frac{6}{10}$ millions to $3\frac{9}{10}$ millions, 1905. Prohibitive taxes now rule in São Paulo with regard to the laying out of fresh plantations. This measure undoubtedly has proved very beneficial to those planters farthest from the exporting centres, and it is a curious property of the business, that plantations recede further and further into the interior, being found over 460 miles from the sea, whilst formerly they were mostly situated near the coast.

When one compares the price received by the planters and that actually attained by the coffee in the retail

market, one wonders where the difference comes in. A little study of the subject will be extremely enlightening.

The coffee broker in Santos is responsible for 3% to begin with, but he has four other sources of revenue.

1. 12% on current accounts.
2. 200 to 400 reis per sack overcharge on the freight from the plantation.
3. Price of sacks costing 11d., and being sold to the planters at 2/2 each.
4. Profit made out of manipulation of the contents of the sacks.

An English firm (Johnston & Co.) has formed a Warrants Company to unify charges, and put an end to this state of affairs, and the brokers have instituted a system of boycottage against it, resolving not to sell it any coffee.

A Propaganda Company has been formed in London (October, 1908) under the title of the San Paulo Pure Coffee Company. The São Paulo Government has subsidized this concern to the extent of £50,000, payable in five yearly instalments. The coffee is put on the English market in half pound tins, hermetically sealed, at 1/4 per lb., either whole berry or ground, and is roasted and put up under the supervision of a delegate of the São Paulo Government.

The Minister of Agriculture has decided to make every effort to push the sale of coffee in Europe, and has allotted for this purpose the sum of £31,500 for the current year, this sum having been voted by the Federal Congress.

COFFEE SUBSTITUTES.

In 1905 there were in Italy 23 manufacturies of coffee substitutes, and in Austria and Hungary at present exist

no fewer than 412 making fig coffee, 142 using chicory, and 14 barley. In Germany (Saxony, Baden and Brunswick) there are 723 factories, and in France 166, whilst in Belgium 60,000 tons of imitation coffee are produced annually.

In England, Russia, Spain, Portugal, etc., chicory is the usual substitute, but the quantity used is not very great.

Cocoa.

The theobroma is native to Brazil, in the regions of the Amazon valley, but to-day it is cultivated as far south as São Paulo; but the coast of south Bahia, and northern Espirito Santo, and Rio de Janeiro is admirably adapted to its growth when the swamps are drained. At a distance of six or more kilometres from the sea it begins to produce well, and thrives until the colder elevated regions are reached, doing best at an average day temperature of some 80 degrees Fahr. The soil most suitable is an alluvium, light and porous. In some parts of Espirito Santo the climate is so favourable to its growth, that it forsakes its usual habitat, and climbs high up into the serras. Here it produces fruit in the second year, instead of the third. Contrary to cotton, cocoa requires a somewhat humid climate. The number of acres under cultivation in Brazil is continually on the increase, and there are immense territories yet available. Shade is necessary for its best development, but the trees should not be planted too closely together, 12 feet apart allows of some 300 to the acre. The second crop is larger than the first, and the yield increases until maturity at about ten years. The tree continues in full bearing for 20 to 30 years at least. Frequently flowers and fruit are seen on the trees at the same time. One variety in Bahia is a

veritable giant in relation to its fellows, reaching nearly 35 feet in height, and with a trunk 9 inches in diameter. Frequently two crops are gathered in the year in Brazil, each fruit being cut from the stalk without injury to either. Expenses of cocoa planting are not more than 60 per cent. those of coffee. The most encouraging feature in this cultivation is the fact that the supply continues to be less than the demand. In 1907 the consumption was 156,000,000 kilos and the production 148,000,000 or a difference of some 7,600 tons. In 1906 the figures were somewhat less favourable, and in 1905 the balance was on the other side.

The cocoa producing zone extends from Amazonas to the north of Espirito Santo, doing best from the 10th to the 20th degrees south of the Equator. Each tree produces on an average 200 pods. One person can take charge of some 1,000 trees. In some plantations the yield is as much as 20 lbs. of beans per tree, which, sold at two francs per kilogramme, or $1/7$, would bring some £800 per 1,000 trees. Taking the lowest possible average yield of some 5 lbs. per tree and *minimum* price of $2/6$ per 5 lbs., we have for a plantation of 4,000 trees £500. One plantation in Bahia yields 13 lbs. per tree, and the cocoa fetches a much higher price than above. This state is likely to export some 27,000 tons (1908-9).

Each plantation may be reckoned to cost some 3\$000, or $3/10$ per tree. In Bahia there are at present some 10,000,000 trees, and the output is not half what it might be, in spite of the fact that this state furnishes 80 per cent. of the entire Brazilian crop. Some trees in the Belmonte district have produced no less than 32 lbs. of *dried* beans in one year. The area of land suitable for the cultivation of cocoa is unlimited (vide British Consul's last annual report).

The State Government would grant a concession for a suitable railway line to tap the richest districts, and give a substantial subsidy for each kilometre of railway completed. The Consul (Mr. O'Sullivan Beare) says that it is worth the serious attention of British capitalists.

SUGAR AND BY-PRODUCTS.

Another important industry which has suffered greatly from a number of causes, is sugar planting.

The sugar cane was introduced into Brazil shortly after the discovery of the country, and cultivation was commenced simultaneously in Pernambuco and São Paulo. It is stated that the soil and climate of Brazil are better adapted to the production of sugar than that of any other country in the world. The planters have (as is the custom of their kind everywhere) taken advantage of the fertility of the soil to such an extent, that, extracting its vital elements without replenishing them, the yield per acre is now only about 20 tons. Instances are not uncommon where the same lands have been under sugar cane for two centuries, and the methods employed in the majority of the mills obtain not more than 6 per cent. out of 15 per cent. of saccharine matter. Owing to the system of milling, and the small yield, the cost of sugar per pound placed on the market, is not less than 1d. Under such circumstances Brazilian sugar cannot compete with that from Cuba, Demerara, etc., where the cost of labour is less, and the methods in vogue so superior. The principal sugar producing states are Pernambuco, Ceará, Parahyba and Rio Grande do Norte. The cane grows well in most parts of the Republic, and a large industry has sprung up in the States of Rio de Janeiro and São Paulo. The quantity of sugar consumed locally in 1902 was about two-thirds of that exported, and a

huge quantity of cachaça, or aguardente, is produced (806,497 gallons in 1904-5), a notable diminution from the yield in 1901-2. Alcohol for illuminating purposes is increasing in consumption, as is also that of treacle. A mill has been started at Campos to make paper out of the refuse of the cane, and others are likely to follow.

If we take the figures presented by the State of São Paulo, we find that the percentage of sugar as compared with other countries to be as follows:—

Tons of Cane per hectare (2½ acres).		Proportion of Sugar per cent.	
Egypt, with irrigation	38·5	...	11 to 15
Argentina „	40	...	11 to 12
Java, intense culture	80	...	14 to 15·5
Haiwii „ „	82	...	15 to 15·5
Demerara	62	...	— —
Louisiana	50	...	11 to 13
Cuba	50	...	13 to 15
Queensland	46	...	— —
São Paulo	50	...	13 to 14·5
Campos (Rio de Janeiro)	50	...	14·5 to 15·5

The above calculations are sufficiently telling, and one can only marvel, and wonder what the result would be after the introduction of up-to-date methods. With sugar cane growing at its portals so to speak, the price of ordinary cubes works out at more than 6d. a lb. in Rio de Janeiro. In the north the cane ripens within 14 or 15 months, and in São Paulo in 18 or 20 months. One must insist here, as everywhere in this work, on the necessity, imperative and increasing, of scientific cultivation in Brazil. It is useless men embarking in enterprises in that country who are not prepared to work on the most approved lines, those who think they can reproduce in Brazil the rule of thumb methods by which they

have impoverished their farms in Europe, are prospective enemies to the Republic. On the other hand, bright, brainy farmers and planters, with sufficient capital, can reap rewards such as they never imagined in the old world. Sugar will pay in Brazil, and pay well if all is not taken out of the land and nothing put in, and if the by-products are properly disposed of.

The present annual output is some 300,000 tons. Materials and equipment for sugar refineries are admitted into Brazil free from customs duty.

COTTON.

During the American civil war, the cotton industry was at its height in Brazil, and it is only the last two or three years that it is beginning to forge ahead again. In 1904, 165,000 bales were produced. The price in the Rio market in 1907 varied between 13s. and 14s. per 10 kilogrammes (22 lbs.) Exportation duties are highest in Piauhv 12 per cent. ad valorem. Freight is high. The Leopoldina Railway (south) and Great Western Railway (north) both having a scale which begins at something over £2 per ton for 150 miles. The lesser distances pay more in proportion, up to double, and the lowest rate is for distances exceeding 200 miles (Leopoldina Railway). Both these lines are English. The Natal and Ceará-Mirim Railway charges per kilometre, exceeding 300, 30 reis per ton. The Central Railway (national) charging something less. Ceará is one of the states most adapted to cotton owing to its dryness, and peculiar climate, but the plant thrives in all Brazil. The most up-to-date states as far as local industry is concerned, are Rio de Janeiro and São Paulo. In 1903, there were in Minas some 37 spinning and combining mills (mostly small), in Rio de Janeiro 29, but

with an output vastly greater than Minas, and in São Paulo 18. In this state in 1903, there were some 37,000,000 yards of cotton manufactured in calicoes, prints, etc., the largest mill with 10,000 spindles and 600 hands, using up 2,000 tons of cotton. In the vicinity of Rio city there are several very large mills, one at Petropolis (Cascatinha) employing about 1,500 persons all told. The overseers of many of the Brazilian mills are English, or of English extraction. Without a question this is a flourishing business. Dividends are being paid of 20 and 30 per cent., and even 40 per cent. at times, and it may safely be stated that every mill is making a substantial profit. Every state has its cotton fields.

£12,000,000, one third of the industrial capital of the country is invested in cotton mills, and still Brazil uses £6,600,000 worth of imported cotton goods. In an appendix at the end of the book will be found details of the number of mills working, and the hands employed in this industry. At present the southern states consume most of their production. In the north the bulk is exported.

TEA.

A small quantity of tea is grown in Minas Geraes, and this culture might be widely extended.

Another plant is, however, found in many localities in this state, and is known as Chá Mineiro. Its botanical name is *Eschiodorus macrophyllus*. It is used as an infusion, and has the most beneficial effects in cases of rheumatism and skin diseases. The leaves are roasted the same as those of matte, before being used.

TOBACCO.

The cultivation of tobacco in Brazil, dates certainly to pre-discovery of the country, for the first voyagers

observed the Indians using the fragrant weed. In 1500, the European conquerors commenced its planting, the first experience being in Bahia. In the latter part of the eighteenth century a large quantity was exported to the mother country (Portugal), and from thence until the year 1808, to Italy, Germany, Holland and England. In 1845 seeds were introduced from Maryland, through the Government, in order to improve the local culture. Bahia is to-day the great centre of the trade, and a great deal is manufactured there by the firms of Dannemann, Stender and others. The best known factory in the south is that of Messrs. Pooock, in Rio Grande do Sul. Some really excellent cigars being now on the market. The city of São Felix, a short distance from São Salvador (Bahia), is the principal manufacturing centre. 1,000 plants produce in this state some 300 lbs. of tobacco. The cultivation requires much labour and care, and it is especially sensible to changes in the temperature or modifications of the seasons. Adopting the system employed in Sumatra, 150,000 square metres (equal 179,400 square yards) requires an outlay of some £1,580. The crop should be 10,000 kilos, worth £2,120. This is the result of one year's working, but of course is considering the plant to be cultivated and dried by really practical men.

The tobacco trade, like a good many more, suffers from the existence of parasites, and traders up to all kinds of sharp practices. It is very common to find in Bahia that the plant is adulterated with various materials to add to its weight. In addition, many of the planters strip the leaves in a very careless manner, and send to market a product that is calculated to prejudice, not only their own interests, but those of the industry at large. Prices have been rising of late, owing to the improvements of

the last few years in the growing and preparation of the leaf. In 1903 the municipality of Caravellas (south Bahia), instituted four annual premiums of £50, £37, £25 and £12 10s. (at present exchange) to the agriculturists who put in 50,000, 30,000, 20,000 and 10,000 plants of the first class. From 1901 to 1907 the exports of tobacco were 199,645,784 kilos, of snuff 106,281 kilos, of cigars 12,095,936 kilos, and of cigarettes 33,482 kilos.

The smaller planters in Bahia employ all the members of their family in the work, and hire their neighbours by granting them lots on condition of one day's service per week, others working on salary, but as a rule no one being amenable to discipline, or caring for their labour, the cultivation is very desultory. Here, as in other classes of agricultural work, the need of hands is severely felt. The native Brazilian usually despises such toil, especially for another's benefit. One great evil is the horde of speculators who advance money on the crops, exorbitant interest is charged, and all too frequently the price paid is fixed at the pleasure of the usurer. Hardly any of the planters are able to deal directly with the exporting houses, and moreover are cheated abominably in the weight of the packages they hand over to the middlemen. The consumption of cigars and cigarettes in Brazil itself is very heavy, and the well-to-do, still smoke those from Havana, Turkey, etc.

The tobacco producing states are—Bahia, Minas, São Paulo, Santa Catharina, Goyaz, Pernambuco, Piauh, Sergipe, Ceará, etc., but it may be said that a little is grown in every state in the Union.

The exports of tobacco from Bahia in 1908 were 14,509 metric tons, worth £512,959. All this was shipped to Hamburg and Bremen. In 1909 nearly 30,000 tons were exported, most of which was of fine quality.

CHAPTER XIII.

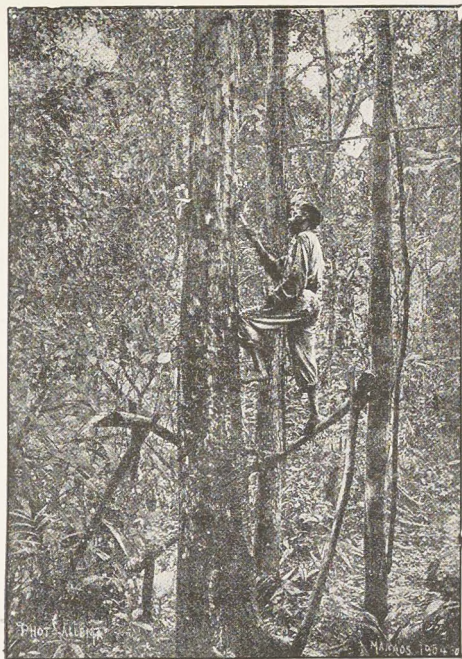
Cereals:

Wheat, Rice, Oats and Barley, Maize.

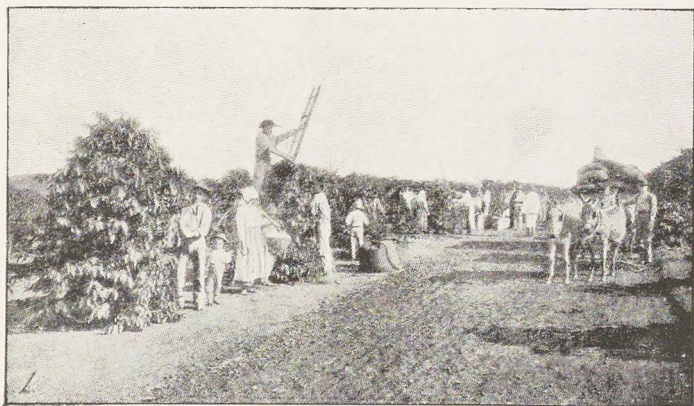
Beans and Tubers.

WHEAT.

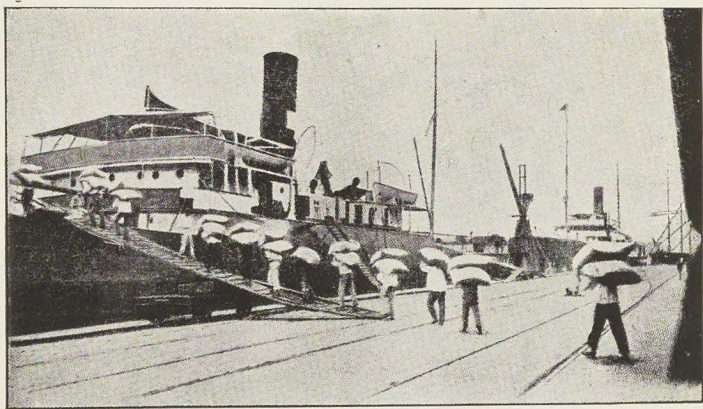
IN Colonial times wheat was grown in the States of Rio Grande do Sul, Santa Catharina, São Paulo, Minas Geraes, and Rio de Janeiro. The cultivation, however, decreased and was abandoned in the early part of the nineteenth century. The real cause of this cessation of planting in the south was various diseases, such as rust, carbuncle, and caries. In spite of the want of success hitherto, the Government offered premiums in 1857 to farmers who produced a certain quantity of wheat of their own growing. In the north, on the table lands of Ceará and Parahyba, and in Minas Geraes, various attempts were made with more or less success, but with final result nil. To-day the great English flour mills (the largest in the southern hemisphere) at Rio de Janeiro are fed almost entirely with Argentine wheat. It is considered that, with more modern methods, such States as São Paulo, Minas, Goyaz, Paraná, etc., might produce immense quantities of this cereal, and experiments now being made are decidedly encouraging. The quantity *imported* 1902-7 was 1,244,460,259 kilos, valued at over £8,000,000. The flour imported was worth nearly



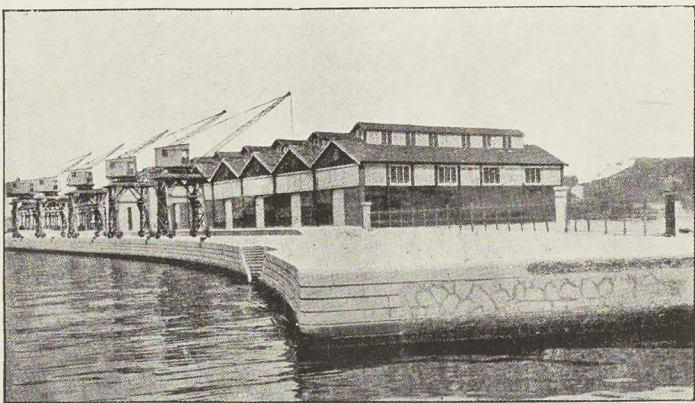
TAPPING THE RUBBER TREES, AMAZONAS.



COFFEE PICKERS AT WORK, SÃO PAULO.



THE QUAYS, SANTOS—COFFEE PORTERS.
(Each sack weighs over 130 lbs.)



THE NEW QUAYS, RIO DE JANEIRO.

£9,000,000. Of this, the capital of the Republic received almost seven-twelfths, Santos nearly one-third, and Rio Grand do Sul the bulk of the rest, very little being directly imported by the other states, although, doubtless, a large quantity was re-shipped in national bottoms. The importation of wheat from the United States has fallen to a value of some £10 in 1906, in spite of a preference customs tariff of 20 per cent., in return for the most favoured nation treatment, which Brazil receives as regards her produce.

Flour imports in 1908 show a great falling off, the grand total being 151,000 tons, whilst the local production increased from 172,779 tons in 1907, to 181,963 tons (1908). The Minister of Agriculture has received details of experiences made in wheat culture (1908-9) in various localities, and in Novo Friburgo in the State of Rio de Janeiro (some 3,000 feet above sea level) the results have been very satisfactory. The State of Paraná, south Minas Geraes, and São Paulo, and Santa Catharina have all produced fair crops. Anywhere in Brazil, provided the elevation is sufficient, and other conditions equal, wheat should grow well, once a suitable variety is selected.

RICE.

Brazilian farmers are not yet up-to-date in rice cultivation, and the recent arrival of Japanese coolies is presumed to be with the view to adopt more intense methods. As with the coffee, the forests are destroyed and burnt. No selection is made of the seed, and it is either dropped into holes, made with a pointed stick, or scattered by hand, and stamped in with the feet. In the north, planting is carried on between January and April, and preferably after a shower. Usually the rice is left to take its own course after planting. That sown

in September generally produces two harvests, the grain of the first being cut away at the top of the stalk. At Iguapé (São Paulo) the cost of planting $2\frac{1}{2}$ acres of land is as follows: Clearing, burning, and planting 50 quarts (litres) of rice, 55 milreis, cost of seed 5 milreis, harvesting 50 milreis, transport to farm house 8 milreis, thrashing and winnowing 12 milreis, a total of 130\$000, equal to £8 2s. 6d., at fixed exchange of $\frac{1}{3}$. The harvest amounts to 2,000 litres, costing $\frac{3}{3}$ per 40 litres, thus 65 reis, or about 1d. a litre. Each 100 kilogrammes of rice, in husk, produces 60 kilos of grain, and 30 kilos of bran, when treated by a proper cleaning machine, of which there are some 30 in the State of Rio de Janeiro, alone. Excluding wild rice, found along the rivers of the north, there are some 15 kinds known in Brazil, one of which is native, and is responsible with crossing, for other varieties. The most common is a Carolina type, and the place mentioned above (Iguapé) gives its name to a kind grown principally in that district. Importation has fallen off considerably. In 1902 over 100 million kilos reached Rio, mostly from Burmah (50 to 60 days by steamer). In 1907 only $11\frac{1}{2}$ million kilos arrived, and it is safe to say that the next decade will see the entire disappearance of this importation. The State of Rio Janeiro has become one of the most important productive zones, increasing its output tremendously the last three years, under the Presidency of Dr. Nilo Peçanha.

At S. Gabriel (Rio Grande do Sul) 240 hectares yielded (1909) 765 tons of rice.

The enemies of rice are numerous, and one of them is the little tico-tico, which answers to our sparrow. When planted near rivers, the capivary is an extremely destructive beast. As yet there is no exportation, but

an English firm has ordered from a São Paulo planter (Senhor Carlos Lehfeld, of Taquaritingá) some five tons as a trial. Being a staple diet, the home consumption is very great. Hardly a Brazilian family that does not have rice served up at least once a day. This grain is grown everywhere, but the most productive States are Santa Catharina, Paraná, São Paulo, Minas Geraes, and Rio de Janeiro.

OATS AND BARLEY, ETC.

The remarks, with regard to wheat, may be applied, with some reservations as regards climate, to the above mentioned cereals, which have every prospect of success in such localities as the central plateaux, extending from Amazonas to Matto Grosso. Very few attempts have been made as yet to cultivate these grains, but results have proved satisfactory wherever experiments have been made, under reasonable conditions.

MAIZE.

The maize was found growing in Brazil by the first navigators, and was known by the name of *abaí* or *avati*, by the Indians. The savages had discovered also its utility in the manufacture of fermented beverages, as well as flour. The whole of the planting, harvesting, and preparation of its products was performed by the women of the tribe. In Brazil it is considered that the soil, which is unfitted for any other growth, will serve perfectly for maize. It is the practice of planting this *graminea* anywhere, which is responsible for the production of so many varieties, and incidentally the survival of the unfit. The kind which is most generally known, however, is the common yellow maize, popular

not only by reason of its abundant production, but also for its resistance to the disease called *calandra-granaria*.

No less than 19 other kinds are found growing in the different zones, and no proper classification has yet been made, nor any determination of which species is best adapted to this, or that climate, beyond the commonly known fact that white maize resists the drought better than any other kind. There is no scientific treatment of the subject of this culture as yet, and the result is, that the yield is entirely out of proportion to the fertility of the soil, and favourableness of the climate. The localities principally favoured by Brazilian farmers are those with a western aspect, avoiding the south and south-east. With the exception of cold clays, or sandy ground, the plant is suitable to most soils, especially admixtures of sand and clay, and the red earths derived from diabase (Devonian type). Sloping lands are deprived of their woods, and burnt after the timber is dry (July to September). Furrows are made with hoes, some four feet apart, and five or six grains are planted together. This work is done either from March to May, or August to October. As soon as the maize attains about four feet in height, the earth is worked up round it with the hoe. Sometimes this is done twice, at three and four feet high. Between the lines of maize it is customary to plant beans, pumpkins, melons, etc. Harvest takes place some three or four months after planting, and the cobs are taken one at a time, and carried in baskets to be spread out and dried. It is rare to find a planter who takes the trouble to manure the land in any way, they prefer to destroy the forests, and plant fresh fields. The cost of planting and harvesting an alqueire of land is reckoned as follows, in virgin forest zones:

Clearing and preparing land	180\$000
40 litres of seed	4\$000
Planting and hoeing	119\$000
Harvesting	48\$000

$$351\$000 = \text{£}21\ 18\ 9$$

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Using modern agricultural

implements	8 15 0
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$$= 8\frac{6}{10} \text{ acres.}$$

An alqueire is so-called, because it is just the area of land required to plant 40 litres of seed, and according to the metrical system, it equals in São Paulo and Paraná 2 hectares and 42 ares, or $4\frac{3}{10}$ acres. In Rio, Minas, and Espírito Santo, 4 hectares, 84 ares, or $8\frac{6}{10}$ acres. In Bahia the measure is tarefa, $2\frac{1}{2}$ tarefas equal one hectare, and further north, the quadra-alqueire, or 100 braças square, is the land measure. Maize suffers from rust, and from various roedors, as the agouti and cavy, and also from the armadillo (tatú), and above everything else, from the all devouring locust, and a variety of other enemies.

Pernambuco and Maranhão export large quantities to Pará and Amazonas, and to Peru and Bolivia. The state which produces the largest quantity of maize is São Paulo, and next in order of importance come Minas Geraes and Alagoas, little being cultivated in Rio Grande do Sul, Rio de Janeiro, etc.

BEANS.

These legumes form, with rice and dry salted beef, the staple food of the majority of the lower classes in Brazil. The greater part cultivated are of a black colour (phaseolus niger, nanus, etc.).

In a plantation made in September, using 42 litres of seed per hectare, in land previously manured, the result was 1,249 litres of beans. Many kinds of red and yellow beans are grown in addition to the above, and they are subject to the same attacks of rust as the other plants mentioned hitherto. The bean being a very gross feeder, it is necessary to enrich the soil before planting, except in rare cases with the first crop. The harvest is over in four or five months after planting, at which time three seeds are placed in a small hole, at a distance of an inch apart. Very frequently beans are planted together with maize, permitting the former to utilize the stalk of its sturdier neighbour for climbing purposes.

In addition to beans, peas (of a variety whose pod is eaten) and lentils are planted, but on a very small scale, and obtaining high prices in the market. As with maize, beans are grown more in the central and southern states.

Tubers.

MANDIOCA.

The credit of the discovery and utilisation of this root is entirely due to the aborigines, who also found out the secret of destroying its venomous properties. In Brazil it may well be asserted that it constitutes a veritable underground storehouse of food. The dish of beans, rice, and fat pork is always thickened by a handful of the coarse flour meal, and it takes the place of bread in many places. Found as far as 30° south, it is peculiarly a tropical and semi-tropical plant. There are three principal varieties, two of which are somewhat bitter, and the third sweet. There are, however, many minor sorts (twenty or thirty). The most prized (called aypim) has a root which weighs about 2 lbs., and is used for a

variety of purposes, making many delicious preserves. The bitter sort (brava or venomous) is used only to manufacture flour. This kind sometimes weighs 15 to 20 lbs., and is full grown in 8 to 10 months. Before this root is fit for consumption, it must be pressed well and washed, and the water and residue must be thrown away out of the reach of animals, as it is distinctly poisonous. The largest roots produce some two gallons of prepared meal. Some kinds contains 23 per cent. of starch. It is planted usually in August or September, in any part of the country, from the coast up to 3,000 feet above the sea level. The plant, crushed and well washed, is pressed into a dry mealy mass, and roasted on hot plates, being continually turned until done. A good hand can prepare two or more sacks per day.

The finest qualities are worth from 12/6 to 15/- a sack, and the coarser, up to 7/6. One disadvantage is that the roasting must be done the same day as the plant is washed and crushed, otherwise it will turn sour. The water, which has escaped from the mass in pressing, contains a large quantity of very fine starch, and the deposit is washed several times, and strained off. Tapioca is a product of the residue.

In Belgium the roots are used in the production of alcohol, in Holland as stock feed, and in England for making starch and dextrin.

ARROWROOT (Araruta).

This plant is native to Brazil, and gets its name from the fact that the Indians used it to cure the wounds made by poisoned arrows. To grow to the best advantage, the root demands a porous, well drained, alluvial soil. Planting is done by means of small slips, and as soon as the new growth makes its appearance, it

is earthed up in a similar way to celery. Planted in March, it comes to maturity in from 8 to 11 months. The smallest fragments of root will soon strike, and throw out leaves. The root must be well washed to get rid of its impurities; it is then crushed, or ground, and mixed with plenty of clean water, and passed through a bolting-cloth, or sieve, to separate the fibrous parts from the powder. The latter is dried in the sun, on perforated tables, and is ready for packing in four days. The price, locally, ranges from 6d. to 1/- a lb. The production is not nearly sufficient for home consumption. The state which is best adapted to the cultivation of this plant is Espirito Santo.

MANGARITO (*Caledium sagittifolium*).

A plant of the family of araceas, little grown, but more nutritive, and easier to prepare, and pleasanter to the palate than any of the other tubers.

POTATOES.

The sweet potato is the most common in Brazil, the English potato, as it is called, being largely imported. Such as are grown in Brazil at present, usually represent the kind which is given to pigs in Ireland. The anomaly is seen in the maritime cities of the Republic, of large consignments of the tuber from England, and latterly from New Zealand, although those grown in Bolivia and Peru, at an altitude of 9,000 to 12,000 feet, are considered far superior to ours. In spite of the fact that the high lands, within a few hours of Rio de Janeiro, are admirably adapted to the cultivation of the English, or, as an Hibernian correspondent corrected me, the Irish kind, and that two crops may be gathered annually, the cultivation is very small, and no pains are taken to select

the right sort of soil. Planted in March, the tubers are fit to be pulled up in June, and sown again in August the harvest is ready in November.

With manuring by means of sulphate of potassium superphosphates, and nitrates, a grower at Barra Mansa (Rio de Janeiro) obtained from one hectare four tons of potatoes. In Rio Grande do Sul, at Pelotas, $13\frac{1}{4}$ tons were obtained.

Another grower in Minas Geraes made a profit of 800\$000, or £50 clear, per hectare ($2\frac{1}{2}$ acres).

The yield of the sweet potato is, however, vastly superior, being 20 times the amount sowed. The latter thrives in a different location, preferring the lowlands, and depressions between the hills. Some of the kinds are ripe in three or four months, and they frequently take a disagreeable taste if grown in manured lands. The red variety is most esteemed, and is the most suitable for the table, the white serving better for animals. To fatten pigs, the country custom is, to let them loose in a sweet potato patch, thus saving the trouble of digging the land, and at the same time enriching it. The sweet potato is considered more nutritive than the European, as it contains more sugar.

YAM.

The Brazilian valleys are covered with this plant, which is considered as a *dernier ressort*, when all other cultures fail. At ordinary times it serves the same purpose as the commoner kinds of sweet potato. In virgin and fertile soil it develops fully in from six to twelve months, the roots weighing from 15 to 22 lbs. Boiled, it is an excellent food for pigs, fattening them extraordinarily.

CHAPTER XIV.

Tropical Fruits, etc.

BRAZIL possesses climates suitable for the growth of every kind of fruit known.

In what corresponds to the European winter in the southern states, all fruit bearing plants common to the northern parts of the world, flourish and give abundantly of their substance. Amongst the better known belonging to the tropical zone is the abacati, produced from California to Rio Grande do Sul. The part eaten is the inner pulp, surrounding the central mass of seeds. The fruit varies from the size of a pear to that of a very small melon. In Mexico a delicious salad is prepared from this pulp. Eaten alone, it requires sugar or lemon juice or both, as it has no acid or sub-acid flavour. It is planted by seed, hardly buried in the earth, but success has been obtained by experiments with shoots and seedlings. Fruiting only in the fourth or fifth year it becomes ripe after January. No diseases are known, and it is a very profitable growth, being worth from 6d. per fruit up to 1s. 6d. in the European markets.

PINEAPPLE.

The abacaxi is the Brazilian name for the finest quality of pineapple (ananaz). It is planted by shoots, after September in the south, and from March to May in the north. It comes into flower in the spring (August to September) and ripens by January. Sometimes fine fruits are sold in Rio de Janeiro as low as 1½d. each

(retail). Pernambuco is a great seat of the trade, mounds being piled up in the covered market, and at a hundred stores. The price asked to passengers in transit is usually 3d. to 6d., according to size. In 1907, 270,572 kilos were exported, of a value of about £5,000.

On an alqueire of land (220 metres square) 80,000 pineapple plants may be cultivated, which at 40 reis each will bring in £200. The cost of cultivation may be calculated at not more than £40.

ABIEIRO (Lucenna-Caimito).

A plant only found in the more tropical states, and never below Santos. The fruit is oval, of a clear yellow, and has two to four seeds; only recently placed on the market at Rio de Janeiro.

PARÁ APRICOT.

The tree grows to 30 feet high and over, and bears a spherical fruit the size of a large orange. It has one large seed only. Eaten raw or used in all kinds of tarts, etc. It has been reproduced hitherto by seed only, but it is considered that slips or cuttings would produce a fruit of much better quality.

ARAÇA.

Araça, a plant belonging to the myrtaceas, the fruit of which is used principally for making a kind of preserve.

CAJU (Cashew).

There are several kinds of this tree, of the family of terebinthaceas, and all are indigenous to Brazil from north to south. It is found everywhere, high up on the table lands or down in the forests or near the sea shore.

In the Brazilian cities the fruit is used to make a very refreshing drink (cajuada) or prepared as a preserve, similar in form to ginger. It is exceedingly agreeable in this latter manner, but the packing leaves much to be desired. The syrup makes a delicious wine, and the curiously formed nut (outside the fruit) is the portion which is well known in Europe. Curiously enough, this plant disdains fertile and rich soil, prospering in an arid waste. The fruits are ripe in November. One type of tree (found only in the woods) attains 50 feet, but the fruit is very small.

CACTUS.

Many kinds of cacti produce agreeable fruit in the warmer parts of the country. One of the bestknown is the Barbary fig, introduced from Mexico. It is more procured, however, for the purpose of cochineal, than for anything else, the fruit being insipid and somewhat acid. Another, the *cereus triangularis*, bears a fruit equal in size to an orange. There is no exportation of these products, and they are little considered locally.

BREAD-FRUIT.

This tree is from 20 to 35 feet in height, and demands moist heat for its most perfect development. The colour of the leaves and fruit is of a light green, and the latter is usually of the size of a large orange. The part eaten is the central pulp, either roasted or boiled. Brazil possesses varieties entirely without seeds. The tree is only found along the coast line, being entirely unknown in the higher lands of the interior. It flowers and bears fruit nearly the whole year round.

FRUCTA DE CONDE (*Anona squamosa*).

The fruit is about the size of an apple, with a very rough scaly exterior. The interior is composed of a

delicious soft mass, eaten with a spoon. The plant is reproduced from seeds, slips, etc., and requires a dry fertile soil. Like the bread-fruit tree, it is only found in warm places. It is very much esteemed in Brazil.

CHERIMOLIA (*Anona cherimolia*).

Derived from Peru, the plant is relatively small (6 to 13 feet high). The fruit, equal to an orange in size, is scaly outside, and formed of a number of sections. The colour when ripe is of a dirty yellow. Sweet to the taste, it has a very agreeable perfume, and is considered the finest fruit of the anonaceas. It is known in Brazil by the name of condessa (countess), to distinguish it from the foregoing, conde (count).

SOUR SOP (*O. Carossol*).

Brought originally from the West Indies. The fruit is equal in size to the citron. It is not esteemed much in Brazil, and requires a very hot climate to grow to advantage

JAMBEIRO (*Eugenia Jambas*).

This myrtacea is found on the sea level, and high up on the table lands, and bears fruit at almost any altitude. The tree is small, hardly ever exceeding 20 feet. The flowers are beautiful, and are succeeded by fine fruit, the size of a plum, and of a rose colour. The perfume emitted by this plant is very sweet, reminding one of the queen of flowers itself, and thus it obtain its name of jambo-rosa. It is produced from seed, and the kernel is loose. The above is the most highly prized variety of the jambos, but there are several others grown, some of which are more ornamental than useful.

GUAVA (*Goiabeira*).

Previously exclusive to tropical Brazil, it has spread

all over the country, and is one of the plants most commercially exploited. In the vicinity of Campos (State of Rio de Janeiro) it grows in profusion in the woods, and at least 20 per cent. of the preserves manufactured in Brazil are derived from this fruit. The locality named produces some 600 tons annually of jelly, consuming in the factories 120 tons of the fruit. The average price, 1905-1906, was 9d. per 32 lbs. There are two crops yearly, January to March, and September to November. The preserve (named goiabada) is frequently badly made, but one or two marks are excellently turned out. In 1905 some 4,517 packages were sent from Campos district to Rio de Janeiro. Each packet represents 4'110 days wages, and the total cost per package placed on the market works out at £5. Each tin (about a pound) is sold at from 1s. upwards. Attempts at exportation to Montevideo and Buenos Aires have not proved remunerative up to the present, in spite of the freights being less to the River Plate from Rio de Janeiro (1,200 miles) than from Campos to Rio, a distance of not more than one-seventh part at most. The exact rates are, per 100 kilos (roughly 2 cwt.), Campos to Rio 5s. 7½d.; Rio to River Plate 4s. 10½d.

JABOTICABEIRA (*Eugenia Cauliflora*).

The handsome tree which produces the jaboticaba grows abundantly in the forests of Minas, Goyaz, São Paulo and Matto Grosso, and is frequently found near the coast. The trunk is extremely smooth, and reaches a height of 30 to 40 feet at times, with an abundance of foliage. The flowers grow, not on the branches, but on the trunk itself, from the ground to the top of the tree. The fruit is about the size of a plum, but rounded, and contains delicious white pulp and one large seed. The

skin contains a large amount of tannin, and much colouring matter. This fruit makes a fine wine, and may be eaten as dessert, or used as a preserve. The tree takes six to eight years to come to maturity sufficient to produce crops, but has an exceedingly long life, and continues to bear till an advanced age. No attempts at improvement of the stock have been made, although it is considered that the fruit would be greatly increased by propagation through slips or grafting. Exportation of this fruit is very difficult, owing to the softness of the interior rendering it liable to smash.

THE ORANGE, LIME AND LEMON.

The bitter orange is common in many parts of Brazil, and from it is supposed to be derived all the other varieties. Grafted, it produces the finest kinds of the sweet orange. The fruit of the first has a loose rind, and it is somewhat flattened at top and bottom. The outside rind is frequently of a much darker colour than that of its sweet relative. The leaves are used as an infusion for various purposes, and frequently take the place of tea. The rind is used for making preserves. The citrus aurantium is the better known, and the king of them all is the kind grown in Bahia, and called navel oranges in England. This is the famous orange that has rendered the California groves noteworthy, although in its Pacific domicile the fruit has deteriorated. In 1907, the exportation of oranges of the above type was some half a million, worth £2,000, a mere bagatelle when one considers the possibilities of this trade, and the annual consumption of England alone, amounting in 1904 to £2,500,000 for oranges and lemons. The mandarin or tangerine orange, brought from China, is much grown in Brazil, but the fruit is almost twice the size of that seen

in the London market. In 1907, $63\frac{1}{3}$ tons were exported, worth £1,150.

The lime is grown in most of the states, and in favourable situations attains a large size. I have eaten some that were as large as the navel oranges, and were most delicious.

The Brazilian lemon is usually quite small, but very juicy when in perfection. Its rind is thick and of a beautiful dark green colour when it is usually plucked for market. There are two other kinds of lemons besides the citrus of commerce, one growing in a state of nature in the woods. The other is called the sweet lemon, and is obtained by grafting. Neither oranges, limes or lemons are at all cheap in the more populous cities, if one considers the abundance produced. Like the quince in the Republic of Uruguay, the fruit is often left on the trees to spoil.

CITRUS.

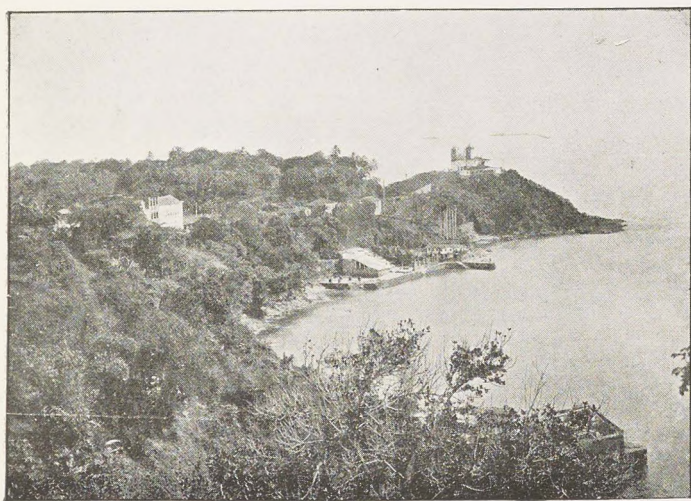
Cidreira (*citrus medica*), the largest of the citrus family, the tree being small, and its branches borne down to the ground by the weight of the great fruit, some of which are a foot or more long. It is cultivated largely for the purpose of making preserves, and requires a fertile soil, and is reproduced from either slips, seeds, or by grafting. In spite of its not being native to Brazil it is perfectly acclimatised, being found in all parts of the country, and in all sorts of climate, doing equally well to all appearance everywhere it is grown.

MAMOEIRO (Mamona).

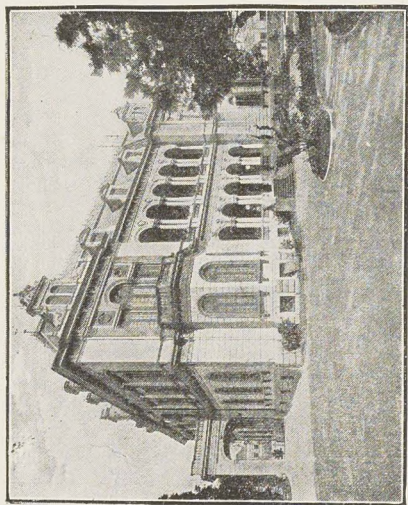
The mamoeiro is a plant of 10 to 20 feet in height, with a straight trunk. The fruit is large, oval, somewhat pointed, and of a dark yellow colour when ripe. It is



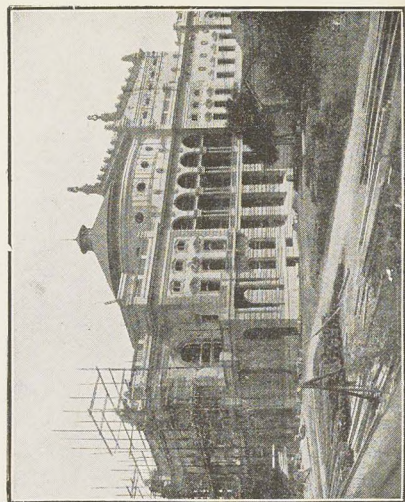
BAHIA, THE UPPER TOWN.



BAHIA, THE ENTRANCE TO THE BAY.



PALACETE ELIAS CHAVES
(A Private Mansion) São Paulo.



THE NEW OPERA HOUSE,
São Paulo.

much esteemed in Rio de Janeiro. In Pará it attains an immense size, weighing from 4 to 8½ lbs. This plant cannot exist where frosts occurs in the winter.

MANGO.

Grows luxuriantly in all the hotter parts of Brazil, especially in Bahia, Pernambuco, and all northern states.

BANANA.

Grows from Amazonas to Rio Grande do Sul, but is hardly found above 3,000 feet in the southern and central states. There are many kinds cultivated, and we may enumerate pacova (in Pará) a very large kind, usually eaten fried or boiled. The outside is red. *Musa cavendishii* (anã), has a short trunk, dark leaves, and produces huge bunches of fruit of a long, curved and cylindrical form, light yellow coloured. *Musa sapientum*—trees high and rounded fruit. Exportation of bananas in 1907, 1,878,904 bunches, worth £6,000. Each bunch weighs on an average 45 lbs., and the heaviest attain 125 lbs., or up to 300 bananas. Freights from the plantations in São Paulo (near Santos) to Buenos Aires (Argentina) total about 12s. 6d. per dozen bunches. In Santos there are some 200 planters who only cultivate one class (the anã), most of them occupying the lands without any right of ownership, as they are the property of the state, and have never been considered worth selling. Each kilo of bananas exported pays 1 real of duty, equalling 1½d. per 100 kilos.

In Cubatão (near Santos) one planter has 500 alqueires under bananas, and the whole of the district is devoted to this culture. The whole of the banana traffic is limited to the coast line from Rio de Janeiro southwards. Pará and Pernambuco are so well situated,

however, with regard to exportation to Europe, that doubtless when their port works are completed, they will prove the shipping centres of an immense trade. The best variety in Brazil is known as the Banana de São Thomé (St. Thomas) as it is of African origin.

A plantation of 500 trees properly treated, yield 10 dozen bunches a month, and a grove of the second year only, will produce 15 dozen bunches per 1,000 trees. Some plantations more than 30 years old are still producing, the only attention given being the clearance of extraneous matter from the vicinity of the plants, and the bunches average 70 bananas, even after such an extension of time. There are reckoned to be 2,000,000 trees within the district above mentioned. Labourers employed in cutting the bunches (still green) are paid at the rate of 4s. 6d. to 5s. daily.

Planting should be done in the Spring, each shoot being put 12 to 16 feet apart. The best situation is a low humid one, with a moist soil.

OTHER TROPICAL AND SUB-TROPICAL FRUITS.

Mangostão. Better suited to the West Indies than to Brazil. It is stated that the State of Pará is the only one where this famous fruit can be grown.

Maracuja. Principally used for the purpose of making refreshing drinks. It belongs to the passifloras, and is distinctly a tropical fruit.

Sapoti. The fruit is of an earthy colour, oval shaped and rather sweet.

Pitangueira. There are several of these belonging to the myrtaceas, all bearing fruits of purple and yellow hues. They are common to Brazil.

Toranjeira (citrus decumana). Used for the manufacture

of preserves. Of less importance than it deserves, and has had no attention paid to it.

The above represent a few of the numerous fruits which have so many forms, colours and tastes. Most of the purely Brazilian ones, it is safe to say, are entirely unknown in England, and it is very difficult to persuade a farmer to make any attempt to grow on a large scale, much less get him to run the risk of sending a consignment to Europe at his own cost. His system of business is exceedingly simple, i.e., to sell on the spot for cash, and chance losing half the profit. Again, apart from such staples as oranges, guavas, bananas and pineapples, there are hardly any merchants or exporters who trouble themselves about fruit. If they do, it is to supply the markets of Montevideo, Buenos Aires, Rosario, and perhaps Chili.

ACCLIMATISED FRUITS.

The European and Japanese plums have both been tried in Brazil, and the latter adapts itself perfectly. Of the varieties cultivated, and which produce magnificent crops, we may cite—

Plums. Abundance (Douglas Babcock), burbank, and yellow Japanese plums.

Damson. Like the oriental plum, this fruit does well in Minas, São Paulo, Paraná, etc.

Mulberry. Acclimatised perfectly, withstanding both heat and cold. Not cultivated for the fruit, but for feeding silkworms.

Cherry (bigarreau, etc.) Experimented with recently in the southern states.

Fig. Universal and highly successful.

At Correias, near Petropolis, there is a fig tree which will give shade at noon to 4,000 persons.

Raspberry. Does very well in the south. There is also a wild fruit which grows everywhere on the mountains.

Apple. Produced to *perfection* in selected soils in the more temperate parts of Brazil.

Quince. Yields splendid crops. Is principally used for the manufacture of jelly. A large quantity of the preserve comes to Rio de Janeiro from the small towns, high up in the Organ and Estrella Ranges in the same state. Theresopolis, for example. No proper attention is given to the cultivation of this fruit.

Strawberry. Fruits perfectly from Rio de Janeiro south, but is quite inferior *at present* to the berry we know and appreciate so well in England.

Nespereira (photinia Japonica). This tree is improperly termed the yellow plum in Brazil. It is extremely common (or the Japanese variety is) in the south, but usually does not bear very well owing to want of proper cultivation.

Peach. Of the fruits introduced from abroad, the peach has made itself more at home than any. Most of the European varieties are grown with some success, but the oriental fruit is not yet seen, except in the catalogue of a professional grower of Pelotas (Rio Grande do Sul).

Pear. Not so well adapted to Brazil, unless it is the sand or Chinese pear.

Tomato. Will grow perfectly and produce fine fruit, but like most things, it requires more attention than is usually given. Does best in the more temperate states.

MELON.

Both the ordinary and the water melon grow freely throughout Brazil.

WALNUTS.

At Jundiahy (São Paulo) walnuts have been grown this year, equal to any imported.

UNCULTIVATED FRUITS.

Blackberry, currant, gooseberry, logan berry, wine berry, barberry, dewberry, cranberry; the true medlar (*mespilus germanica*) as well as cob-nuts and chestnuts, and the olive and sweet almond. All worth trying in the south.

FRUITS.

The Royal Mail and Messageries Maritimes Companies have entered into an accord with the Government to transport fruit at the following rates per cubic metre:

Pineapples	20 milreis	=	200 pines	to cubic metre.
Bananas	8 „	=	50 bunches	„
Oranges	15 „	=	3,000 oranges	„

All other fruits the same price as oranges. Thus, if we reckon the outside value of a pineapple as 100 reis, or 1½d., f.o.b. Rio, and freight to England 100 reis more, we have a total cost of 3d. each delivered London. If the planter exports a large quantity, 4½d. should be a good price for him, and 9d. a fair *retail* charge for such fruit as costs at present at least double. The Ministry of Agriculture has now offered the following premiums, i.e., 10, 5, 3 and 2 contos of reis for those growers who export the most fruit during eight months. The quantity must not, however, be less than 50 tons.

BEE CULTURE.

The honey bee, as known to Europe, is not native to any part of America. There are, however, some honey producing bees, common to Brazil, and in particular one stingless variety. The only apiculture practised in Brazil is with the bees introduced from Europe. Most of the states produce a good quantity of honey, especially

Rio de Janeiro. The largest colony is at Campos, and consists of some 160 primitive hives composed of wooden boxes measuring 24 by 12 inches, by 16 inches high. The bees are of Italian origin, and are derived from some imported in 1904. The honey is of excellent quality. In 1905, the exportation of this state was some $34\frac{3}{4}$ tons. This culture is also carried on on a small scale in many parts of São Paulo, and planters of vanilla are advised to keep bees in order to artificially fertilise the female flowers. São Paulo produced in 1903 some 31 tons of honey, worth £1,400, and $22\frac{1}{2}$ tons of wax, valued at £2,400. The average price per kilogramme being—honey 9d., and wax 2s. 6d. Prices in Minas Geraes are somewhat higher, owing to limited output. Using the most modern apparatus, in Paraná, each hive yields 25 to 30 kilogrammes of honey, and from one to two kilogrammes of wax per annum. In Rio Grande do Sul in 1905, 69 tons of honey were produced, worth nearly £7,000. The amount of wax totalled 41 tons. Most of the honey sold is in a semi-liquid form and is retailed in bottles and very frequently has an exceedingly suspicious colour, as if treacle had been mixed with it. The principal use of the wax is for church candles, and the amount exported to Europe bears no comparison to that consumed in the country. Most of these products go to Germany, and the figures for 1907 are—

Honey, 7,124 kilogrammes, value	6,357	\$000	paper
Wax, 148,818	„	„	272,451 \$000 „

SERICULTURE.

In spite of the climate of most parts of Brazil being remarkably suitable to the silkworm, the above industry is as yet in its infancy. As we have already seen, the

mulberry thrives splendidly, and neither it nor the silkworm suffer in any degree worth noting from the diseases so common in Europe. One of the principal reasons for the non-development of sericulture, has been the great cost of mounting factories capable of dealing with the raw silk. In Petropolis, however, there are two mills, one Italian and the other German. The climate of this delightful little city (justly termed for its beauty—A Rainha do Brasil)—is so well suited to the growth of the mulberry tree, that cocoons produced locally prove superior to many foreign ones, not only in brilliant colour, but also in elasticity of thread. The two Petropolis mills consume 45 tons annually between them, but most of the thread is imported. In Nova-Trento (Santa Catharina) the whole municipality is inhabited by colonists from Trent, in Austrian-Italy, and most of the inhabitants are engaged in silkworm culture, the proceeds being used by two small factories belonging to a religious order (Brazilian), where the nuns themselves are the actual work-people. The first factory was started in 1900, and the products obtained three gold medals at the St. Louis exhibition. The annual output is now 3,000 yards of silk, 216 scarves, and over 100 pairs of stockings. The other factory is somewhat smaller, the production amounting to about £1,800 in value last year. Besides the above there are many hand looms scattered throughout the country. In Rio Grande do Sul the industry is further developed, two large and various small factories being established, and in Minas Geraes, Barbacena is the seat of this culture, already well advanced. The colony of Rodrigo Silva, in the above municipality, produced 2,460 kilos of cocoons in 1905, and distributed no less than 38,600 mulberry slips. The cocoons are generally collected from August to September, September, October,

and November to December. 30 grammes of eggs produce an average of 36,000 caterpillars, which consume 800 to 850 kilogrammes of fresh mulberry leaves to produce from 50 to 70 kilos of cocoons, the silk being of excellent quality, but somewhat coarse in thread. Barbacena is, it is worthy of note, some 3,400 feet above sea level, and slight frosts are not at all uncommon in the winter. Many other districts in this state are taking up silkworm culture with success. In São Paulo a factory has been started, and the silk produced took the first prize at St. Louis, three medals at Rome, and one at Milan, besides others at Campinas and São Paulo city. The following figures illustrate the profits to be obtained from this industry in Brazil, even under present conditions.

EXPENSES.

30 grammes of eggs	...	...	...	9\$500
Mulberry leaves	...	...	...	20\$000
Labour, etc.	...	...	...	65\$000

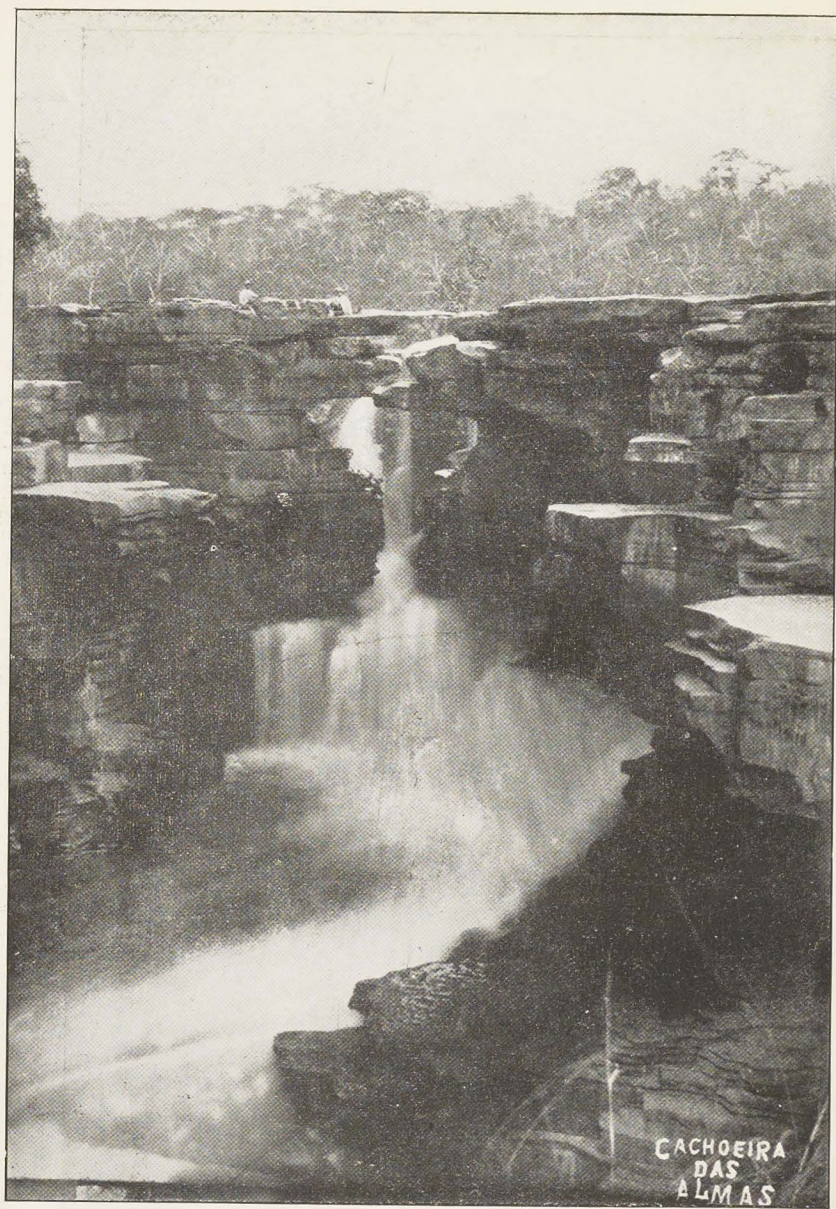
Result—say 60 kilos of cocoons, worth 240\$000.
(16 milreis equals £1.)

Profit 145\$500. This is the result of 30 days' work only, utilising the services of women and children. From these figures one may easily calculate the profit to be obtained from an outlay of, say £1,000. It must be remembered that the duty on imported manufactured material is enormous. Notes just to hand from Minas Geraes inform me that the Government of this state has decided to open the following credit for three prizes: (1) 10 contos of reis (£625), being 1/3 per kilo, to those producing 10,000 kilogrammes of cocoons. (2) £312 10s. to the planter with at least 2,000 mulberry trees properly cultivated; and (3) 45 contos of reis, equals £2,722 10s.,



THE IGUASSÚ FALLS.

These falls cover an area of nearly 3,300 yards or $2\frac{1}{2}$ miles, they dwarf Niagara in many respects. The total fall is 320 feet in three leaps, the third one being 213 feet.



RIVER SOMNO, CACHOEIRA DAS ALMAS.
Height 63 feet. Horse power, 10,000. Taken at end of dry season.
By the courtesy of H. Pearson Esq.

to the two first factories possessing modern machinery, employed in the weaving of silk, produced from national cocoons. Enough has been said to show the prospects open to any intelligent capitalist in Brazil.

VITICULTURE.

Grapes have been known in Brazil since early colonial days, and the kind mostly grown are white muscatel, lady's finger and ferrar. Amongst others introduced more recently, the *uva americana* or *isabella* dates back some 50 years.

In the States of Rio, S. Paulo, Paraná, etc., from October to April, the vine suffers from diseases engendered by the humidity, such as fungi. In spite of this, here are found the finest sorts. An expert grape cultivator (Dr. Fialho) near Petropolis has some hundreds of varieties growing, and exhibits the most magnificent bunches in the capital ($3\frac{1}{2}$ hours by rail and water). Even in the City of Belem (Pará) a vine exists which produces three crops annually, this is under adverse conditions, as it rains daily in that place.

In the valley of the river São Francisco the climate is best adapted to grape culture, and particulars are given in a Government report by Dr. João Silveira in 1906, of the results obtained from 175 acres of alluvium. To a depth of nearly 20 feet the soil is composed of sand, mixed with clay and black earth, without stones or foreign matter of any kind. The low lands of this area are flooded from December to January for a distance of 1,300 yards. The climate is dry, with not more than 12 or 14 heavy rains in the year (October to May). The highest summer temperature is about 100° F., but the nights are always agreeable. In the winter the highest

point reached by the mercury is 85° to 90° F., and the lowest 45° to 50° F. Irrigation is carried out throughout the dry season. The area is divided into two parts. The first has 640 vines remaining from 1,000 originally planted, and there are 150 varieties from the four continents. The most delicate and finest European sorts give three harvests annually, with a supply of 70 to 80 quarts of water daily, and the ground is well manured. The quantity of grapes produced under such conditions is enormous. In the city (Joazeiro) one vine of three years of age had 542 bunches. At the trial grounds, white muscatels have weighed over 4 lbs. the bunch.

This experience has proved one of the most successful, and has encouraged the Department of Agriculture (Bahia) to further outlay. From this trial ground, slips have been distributed all over the country (more than 34,000). The Agronomical Institute of Campinas (São Paulo) has also sent out some 30,000 to 40,000 per year. The state most occupied with the vine for wine making is Rio Grande do Sul. Between 27° and 34° south the climate is entirely suited to the vine, and corresponds with southern Italy, except as far as the topography is concerned. In this Brazilian state, the vine is not attacked by its terrible enemy, phyloxera. Already native wines have received high recognition (Milan Exhibition) in spite of the competition of European growers with long experience and great reputation. Most of the vineyards belong to Italian colonists, and the harvests are usually exceedingly good. The following are typical results:—(1.) $2\frac{1}{2}$ acres equal $7\frac{1}{2}$ tons of grapes. (2.) $2\frac{1}{2}$ acres equal $17\frac{1}{2}$ tons of grapes. (3.) (Caxias) 18 tons per hectare ($2\frac{1}{2}$ acres), and Guaporé and Bento Gonçalves 25 tons per $2\frac{1}{2}$ acres, average 11,480 litres of wine. In Portugal the average yield is 1,870 litres; France 3,300 litres and

Chili 5,000 litres. In Nova Trento a vine exists 17 years old, from which has been taken $1\frac{1}{2}$ tons of grapes, producing 792 litres of wine.

In Rio Grande grapes sometimes sell at $1\frac{1}{2}$ d. per 11 lbs., and the wine is worth the same price for one-third dozen bottles, retailing in Rio de Janeiro for $7\frac{1}{2}$ d. to 1s. a bottle perhaps. In 1902, the entire export was 288,000 litres, and in 1906, it rose to 2,700,000 litres. It is stated that the production, including local consumption totalled 10,000,000 litres the same year. The average percentage of alcohol in these national wines is 7 to 13. The proportion of acid 0.866 to 0.1050. Those of France are 0.28 per cent. to 0.39 per cent. The above figures relate only to wine made from the grape. As already mentioned, the pineapple, jaboticaba, cashew and other fruits are extensively used for the purpose of making wines.

In spite of the increase in acreage of vineyards, the importation of wines is on the up grade in Brazil. In 1908, 45,521 tons were received from Portugal, and 19,941 tons from Italy, Spain, France and Germany in the order named.

Of spirits, cognac is the most consumed, with whisky a good second.

DRY FARMING AND IRRIGATION.

In the State of Ceará, the only one in Brazil which has to study the problem of drought, the Government engineers are applying the above methods to avoid failure of the crops. On the highlands in the interior, in the most suitable localities, immense reservoirs are being constructed, with outlets by which the rain collected, may be conducted over the parched soil. As regards dry farming, Dr. Baeta Neves has been studying

the Campbell system as employed in the western states of North America, and experiments are now being made in semi-arid parts of the country.

AGRICULTURAL INSPECTION.

The Federal Government has created a service of agricultural inspection throughout the Republic, which is divided into 12 districts, which are planned as follows :

- | | |
|--|--------------------------------|
| 1. Amazonas and Pará. | 7. Minas Geraes. |
| 2. Maranhão and Piahy. | 8. São Paulo. |
| 3. Ceará, Parahyba, and Rio Grand do Nord. | 9. Paraná and Santa Catharina. |
| 4. Pernambuco and Alagôas. | 10. Rio Grande do Sul. |
| 5. Bahia and Sergipe. | 11. Goyaz. |
| 6. Rio de Janeiro and Espirito Santo. | 12. Matto Grosso. |

As well as a special division in the Acre.

Each district will be under the control of a delegate of the Federal Government, who will present a most minute monthly report. He will be charged with lecturing, the organisation of agricultural shows, and of demonstrations of the use of various machines ; in short, his duties will be those of an agricultural expert and adviser, and he will be especially charged to initiate new cultures and improve existing ones of every kind. There is no doubt that this measure will be productive of great benefit, especially in those states without organised agronomical stations or agricultural colleges.

CHAPTER XV.

The Pastoral Industry.

Forage Plants, &c.

WITH regard to pastoral conditions, Brazil must be divided into three zones, i.e., tropical, semi-tropical, and temperate. The first is naturally the north; the second the central territory; and the third, the whole of the south. Before dealing with the stock it will be necessary for the benefit of practical farmers to consider the grasses.

GRASSES (Gramineas).

Root grass. Not exceeding 10 to 12 inches in height, always green, and springing up as if by enchantment, after being cropped quite close by thousands of beasts. The local cowboys say that it contains sufficient salt, impelling the cattle to drink. This grass is found from Goyaz to the Araguaya and Tocantins.

Capim branco (white grass), considered to be *Andropogon glausens*. There are two or three kinds of this graminea, and they are found in patches amongst the first named grass, but are not so resistant.

Mimoso. Grows along the central part of the São Francisco River.

Marmelade grass. A giant reaching 16 to 17 feet high, peculiar to the lower parts of the Araguaya.

Rice grass. On the margin of the rivers generally.

Beach grass (*panicum fistolarum*). The principal green food of stock in Matto Grosso.

Capim gordura (*tristegis glutinosa*). The commonest in Brazil, growing wild everywhere.

Dr. L. Glaziov collected, in a short time, no less than 155 *new* varieties of gramineas on the central plateaux of Brazil. It is impossible to enumerate the names of a tenth part of the plants suitable for forage, and, if it were, undoubtedly their names would be entirely unknown to the general reader. Suffice it to say that there is no lack anywhere, neither of food nor water, and the latter is abounding, and as pure as virgin snow.

ALFALFA.

This leguminous plant is hardly cultivated at all in Brazil, to the great prejudice of the stock breeder. Some is imported from the River Plate in the form of hay. In the model farm at Gamelleira, various experiments have been made demonstrating that 10 crops may be had yearly, giving 173 kilogrammes from 100 square metres. Dr. Carvalho Britto on his farm at Pedro Leopoldo (Minas Geraes) planted in 1908, 10 kilogrammes of alfalfa seed in 1,200 square metres, and on the 10th of December, harvested 926 kilogrammes of green alfalfa, and 300 kilogrammes of hay. The local (Rio de Janeiro) price would be about 150 reis per kilogramme. To achieve the best results, the soil should be of a good depth and fairly light and porous. To each hectare some 700 kilogrammes of lime. Some 40 kilogrammes of seed will suffice to the hectare.

Stock.

In Rio Grande do Sul there are reckoned to be, at the time of writing, 4,300,000 oxen, besides 2,000,000 just over the boundary line in Uruguay, but belonging to

Rio Grande stock raisers. Calculating the population of Brazil as 20,000,000, the consumption, per annum, should be about 12,000,000 bovines, and in live stock in all, some 30,000,000. In Rio de Janeiro the average amount of beef eaten, per inhabitant, is 22 kilos annually. In the State of Minas there are more than 100 butter and cheese factories producing merchandise to the value of 6,000 contos, equal to £370,000. The exportation of butter from Santa Catharina, 1907, was 667 $\frac{2}{3}$ tons. The Brazilian oxen, derived from the primitive and isolated herds, probably natural to the country, are quite small, weighing on an average not more than 400 lbs. when dressed. These animals are noteworthy for their immense horns, one preserved having a capacity of five or six quarts. In Goyaz, and adjoining states, a variety of cows called mocha, is much esteemed, and is considered, locally, equal or superior to any of the imported stock. The zebú has been introduced with great success, and in the north the Malabar is found widely spread. Recently, Durhams, Jerseys, and Herefords have been brought over, as well as various specimens of the Siminthal (a Swiss type). Apart from Rio Grande do Sul, the Brazilian states employ the most primitive methods of stock raising, the herdsmen limiting themselves to visiting the pastures now and then, and somewhat more frequently at breeding time, when the calves are immediately separated from the cows, and shut up in corrals, where they are allowed to feed twice daily, morning and evening, when the cows return voluntarily to the enclosures. The cowboys of the great plains of Goyaz, Matto Grosso, and other central states, are dressed entirely in leather from head to feet. They are usually paid by a fourth or fifth part of the production. Each stock-raising district of Brazil has its own dress and customs, and technical language.

In the north the oxen are either seized by the tail or lassoed. In Rio Grande the cowboys use the bolas. In the same state the Argentine-Uruguayan term of *estancia* is employed, instead of the Portuguese word *fazenda*, used in the other parts of Brazil. The animals are usually marked by cutting their ears in a distinctive form. Where it is necessary to give salt, this is done in January, May, and September, in the proportion of one sack to 70 oxen. The drover, who is accustomed to complain of travelling 10 or 15 miles, with a few beasts, over good roads in England, would, doubtless, open his mouth at the thought of a hard journey, varying from 450 to 600 or more miles, with hundreds of wild oxen, many of them laden with stores. From Matto Grosso to the south of Minas Geraes is 1,050 miles, and the whole of this distance is annually travelled by many indefatigable horsemen. It is not only the vast distances traversed that render the drover's life an onerous one. Sometimes at dead of night the cry of a panther in the woods will suffice to stampede a thousand head. The noise *en route* of the clashing horns of the beasts can be heard for leagues, and resembles a distant clap of thunder. As the only time possible to drive stock is the rainy season, the camping grounds become quagmires, with the animals breast-deep in mud. The average number of oxen in a drove is from one to two thousand, and this frequently represents the whole capital and credit of the drover.

Sometimes the owner loses the whole herd before reaching his destination. The animals are emaciated, living skeletons, on arriving at the resting and fattening place, where they remain 8 to 12 months. From Barreto (Minas) they are sent to São Paulo on foot, or by water, if destined for the Federal Capital (Rio de Janeiro). In Matto Grosso an animal two years old is worth from £1

to £2, four years old, £2 10s. to £3. For a saddle or draught ox, from £3 to £5 10s. In Goyaz an ox, more than five years old, is valued at £2 to £6 5s., according to the number of heads available. In Piauhy the top price is £1 5s. The cost of a journey of some two or three months is about £1 per head. The most important cattle fairs are, Tres Corações (Rio Verde), Bemfica, near Juiz de Fôra (Minas), Sitio (Minas). The whole of the stock sold at these fairs is destined for the municipal slaughter-house of Rio de Janeiro, at Santa Cruz, where, in spite of the immense population it has to supply, not more than 400 beasts are killed daily. The reason of this is the entire want of cold storage. This will soon be remedied, as a contract has been signed with a company that will entirely modernise the whole affair. In Rio Grande do Sul there are 21 factories for the preparation of xarque (charque) or pemmican, or jerked beef, known in Brazilian shops as carne secca (dried beef). Brazil consumes 80 per cent. of the world's production of this meat. Fortunately the importation is decreasing, and no doubt the consumption of this frequently unpalatable article will be gradually reduced to a very low amount. Each ox gives 75 kilos of meat, worth 380 reis a kilo, 25 to 30 kilos of hide, at 660 reis a kilo, 22 kilos of fat at 300 reis. 40 quarts of salt are used in the preparation of each lot of flesh. In Matto Grosso there is a large extract of meat factory, owned by a Belgian company, and 60,000 oxen are slaughtered annually. In Rio Grande there are also several small preserved meat factories, and one large cannery, which is also the most important biscuit factory in Brazil (Leal Santos & Co.)

A syndicate has been formed in London, with a capital of £1,000,000 for the purpose of stock raising in south

Brazil, and an American company has obtained a large concession of lands in Piauhy for the same end.

EXPORTATION OF HIDES (Rio Grande do Sul).

1907	(salted and dry)	...	...	...	...	746,008
1908	"	"	...	...	...	766,493

HORSES.

The principal credit for scientific study of the pastoral industry belongs certainly to the State of São Paulo. This state has now taken in hand the improvement of the national race of horses (which is undoubtedly Arab, or a degenerated variety of this famous breed). In some parts there are Russians and Anglo-Normans, some worth £62 10s., when broken in. In Minas there exists a good stock, derived from Arab stallions and national mares. In the northern pastoral zones there is a race of horses capable of covering 60 miles daily. The Brazilian horses are not, as a rule, large, but they are very wiry. By the initiative of the present Minister of War, the Brazilian cavalry is being remounted with national equines, the regulation demanding 1 metre 48 centimetres in height (about 14½ hands), and no difficulty is experienced in getting animals over this size.

MULES AND ASSES.

The bulk of the carrying trade in Brazil rest on the backs of the former of those two useful animals, and no others have been so despised and ill-cared for. They are sometimes distorted in the legs, and this is attributed by the breeders, to the insufficiency of lime in the pastures. The only states that have devoted any attention to the raising of this kind of stock, are Rio Grande do Sul, Paraná, São Paulo, Minas Geraes, Goyaz, and Bahia, the penultimate state exporting mules to Bolivia. The greater

proportion of the animals in use in the Republic, are, however, imported from the Argentine Republic. Whatever progress has been made in recent years is principally due, not to the breeders themselves, but to the efforts made by the Governments of such up-to-date states as São Paulo, Paraná, Minas Geraes, etc.

SHEEP.

We must turn again to the Paulistas, if we wish to see what has been accomplished in the way of sheep breeding. Amongst these enlightened farmers one may come across splendid specimens of the Oxford, Southdown, Hampshire, and Rambouillet sheep. In Rio Grande, the Southdown, known locally as black face (*cara negra*) is preferred, and the wool produced is abundant and fine. Not only the south, but as an illustrious Brazilian, Dr. Assis Brasil, says, the plateau of Paraná, Santa Catharina, and Rio Grande, with an average of 2,000 feet elevation, is well suited to the sheep, more perhaps, than even Argentina or Australia. How much more, then, central Brazil, with 3,300 to 4,000 feet of altitude, and the most delicious climate in the world. In Goyaz experiments have proved that the sheep is entirely adapted to this zone.

GOATS.

Here we find the beast who (as in Europe) will get a living where any other will starve. Where the Cearense has to emigrate sometimes, owing to the drought, his goat finds ample subsistence, and this state (Ceará) exported in 1906 more than 400 tons of skins, worth 1,500 contos of reis. In Piauhý a splendid milch goat is found, of a remarkable size, and all over the northern hills, from Maranhão to Bahia, hardly a family exists without possessing a herd. The cost of

their keep is less than that of any other kind of stock, and the pecuniary results are almost immediate. One may say that this animal is found everywhere in Brazil, especially where others cannot be profitably raised, amongst a vegetation composed of cacti and agaves of every kind, the most spinous sorts naturally predominating. It is said that the goat can pass months without needing water, and furnishing milk all the time.

SWINE.

Introduced soon after the discovery of Brazil, the Portuguese types still preserve their distinguishing marks. One kind is an enormous beast, nearly 6 feet in length, thick-skinned, short legged and snouted. It is known by the name canastrão (big basket). Most English pigs are now found, as the Yorkshire, Berkshire, Hampshire, and Leicester, as well as others from Italy, Poland, etc. The food given to these animals, all over Brazil, consists of maize, mandioca, pumpkins, skimmed milk, etc., and as our hogs are let loose in the woods to eat the acorns, so their Brazilian brothers fatten on the fruit of the native pine (*Araucaria Brasiliensis*). The State of Rio Grande do Sul is the centre of the lard trade, having 11 factories, supplied with some 8,500 tons of fat. Minas, Santa Catharina, Goyaz, and Rio Janeiro are other pig breeding states. Bacon, such as Englishmen know, is not cured, and a Portuguese once asked me what was that meat, with a piece of lean and a piece of fat, alternately, that they gave him for breakfast on the Royal Mail steamer. Brazilian bacon (toucinho) is nothing but a great mass of fat, three or four inches thick, with quite an unappetising look. To sum up, Amazonas is suited to oxen, but not to goats or pigs. Pará is, more or less, in the same conditions, and all the other states

are well adapted to the introduction of almost any stock. Rio produced, in 1906, no less than 3,707 tons of milk, and 61 tons of cheese. Petropolis district being one of the richest, making 6,984 kilogrammes of butter, and 18,012 of cream cheese in 1907. Santa Catharina, in 1905, already made 419 tons of butter, and Minas Geraes exported (principally to Rio) in 1907, 5,100 tons of milk, 4,635 tons of cheese, and 1,420 tons of butter, nearly all of this passing over one line of rails (The Central). All the milk was used in the Capital of the Republic. The total value of products of the pastoral industry, in this state, amounted to £2,891,599 in 1904, and has, undoubtedly, very much increased since then.

A great feature of Rio now is the dairies, where one may sit (as in a café), and drink milk, hot or cold, at about 1½d. a glass.

Poultry.

There is very little to say about this subject except that undoubtedly it is a branch of farming which would be most lucrative, more especially because up to now, very little care has been taken with either fowls, ducks, geese, or turkeys. Petropolis again is one of the most up-to-date centres, and a low estimate calculates the annual production of eggs (hens) as 10,000 dozen.

CHAPTER XVI.

Geology and Mineralogy.

THIS section has been left almost to the last, the writer sacrificing his predilections to a sense of the relative importance of the subject. It is, however, a very fascinating one, and pity it is that it cannot be dealt with here in a more adequate manner. If we glance at the map of Brazil we find the whole country cut up as it were by great rivers, their basins being divided by long ranges of mountains from four to 7,000 feet in altitude, and with a general trend north and south, except in what is known as the central plateau, where the serras run in all directions, having their meeting point where the head waters of the Parana and the great affluents of the Amazon, the Tocantins and Araguaya, and the São Francisco are not far distant from each other (as distance goes in Brazil). This latter river flows through a broad valley, with table land bluffs frequently 20 to 30 miles distant from its banks. It forms for three-quarters of its course the western boundary of the high lands, extending almost from the coast in two or three distinct ranges. In studying the geology of Brazil, we shall find, as far as its economic aspect is concerned, that this river plays (and will more) a very distinct part. The Guianas are entirely separated from the main ranges of Brazilian mountains, and this latter constitutes almost the whole of the continental highlands east of the Andean system. The mean elevation of the Brazilian massif is some 3,000 feet, and Itatiaia reaches over 9,000 feet. The range that is

visible all along the coast from Pernambuco to Rio Grande do Sul is of a composite character, mainly being constituted of gneiss, and other forms of granite rocks. Itatiaia being largely hornblende, and Tinguá (near Rio) said to possess rock formations peculiar to itself, including crystalline nodules called tinguáote, or tinguáite, to adopt an orthodox mineralogical termination.

Although this broken range contains some minerals, south of the Parahyba river, where it begins to pile up its highest masses; there is probably little of value, as we generally find that rocks of a distinct character such as granite undecomposed, are not productive of much mineral riches, unless quartz is a predominant factor. In reality this lower section of the coastal range, and known as the Serra do Mar, Orgãos, Estrella, etc., with a south-westerly tendency to the frontier of São Paulo, is a distinct mass or series of masses. Seen from the highest point of the spur near Petropolis, at over 7,000 feet, one has a clear view of hundreds of peaks all over the state, and can form a faint idea of the immensity of the mountain system of the country. Speaking broadly then, we shall say that the geological formation of the whole of the State of Rio is more or less the same. Once across the Parahyba (or upper Tieté, in São Paulo State) we, after descending to 1,500 or 1,800 feet, rise again at the Serra da Mantiqueira, reaching a culminating point (by rail) close to the City of Barbacena. Beyond the limit of the valleys of these two rivers, the coastal range comes in close contact with the Serra da Mantiqueira, and with other and less well defined ridges. In the section confronting the Parahyba river, this Serra attains its highest mean level of some 6,500 feet, and where the coast range approximates closely to it, we find Itatiaia, or at the bottom of an elongated V. This

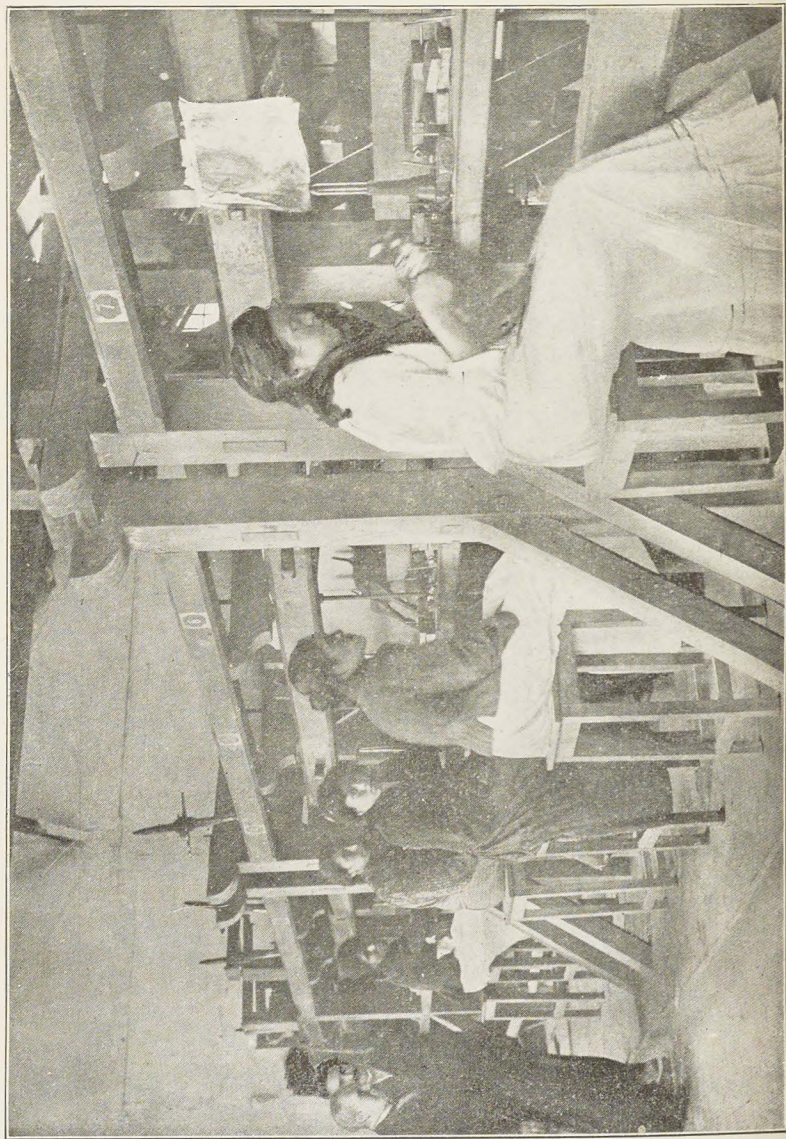
mountain contains besides granite, gneiss, hornblende, syenites, tuffs and phonolites, characterising ancient volcanic centres.

The third principal range of mountains, known as the Espinhaço (backbone), becomes detached from the Serra da Mantiqueira in eastern Minas Geraes and taking a northerly course, forms the eastern rim of the São Francisco basin. We have noted the course of the first two ranges, i.e., south-west and south-west, terminating with easterly and westerly spurs, the former marking the culminating point of Brazil.

The Espinhaço is noteworthy for the fact that the older crystalline rocks, gneiss and granite, are subordinate to a series of ancient metamorphic schists, quartzites and limestones, and to a newer series of sandstones, and conglomerates. The older crystalline and metamorphic rocks are sharply folded, and the newer series rests unconformably in gentler folds on their upturned edges, forming the peaks most predominant in the Espinhaço, reaching 6,000 or 7,000 feet. The metamorphic schists are rich in iron, manganese and gold ores, whilst the sandstone series is frequently diamondiferous. This itacolumite (or flexible sandstone) is characteristic of the districts of Diamantina, Grão Mogul and Minas Novas in the State of Minas Geraes, and of the districts of Sincora and Lençoes in Bahia. In the south, in Santa Catharina and some part of the Rio Grande, we find the carboniferous beds, and in Paraná, high sedimentary plains. The central massif is not as yet properly surveyed, whatever knowledge of it possessed, being limited to the immediate vicinity of the great rivers. The coffee zones of S. Paulo, Minas and Rio de Janeiro are characterised by a red earth derived from diabase types of rocks of eruptive origin. The plains in



RIO MANSO FALLS, MINAS GERAES.
An intake at the head of these falls supplies water to an electrical plant operating a dredge.
By the courtesy of the Diamond King Mining Company.



WOMEN LAPIDARIES AT WORK, DIAMANTINA, MINAS GERAES.
By the courtesy of the Diamond King Mining Company.

the region of the upper São Francisco consist principally of sandstones and shales. From the Doce river (Espírito Santo) north, with occasional interruptions of the older rocks at Ilheos (Bahia), etc., we find a narrow strip of elevated sedimentary beds, as far as the mouth of the Amazon. The mean elevation of these hills is about 300 feet, and their highest point may attain 900 feet. For economical purposes we must limit ourselves as far as the present work is concerned to certain more or less well defined areas in the States of Minas, Goyaz, Matto Grosso and Bahia, and to the known occurrence of minerals in other states in isolated localities. The profitable working of such deposits (probably the richest in Brazil) as lie outside this region, is a question of the future, when means of communication are better than they are at present.

It is said that there is no rule with an exception, and recent discoveries of tourmalines and topazes in the State of Rio de Janeiro have called public attention to a district hitherto considered barren. Before proceeding to deal with the mineral resources of the Republic in detail, the attention of unskilled prospectors is called to the fact that in this great country many rich deposits are found under geological, or more properly petrological, conditions widely differing from those of better known fields, such as S. Africa, Ceylon, Australia, India, etc.

In place of dealing with the states first I shall take their mineral productions as far as possible in alphabetical order, with the warning that unless so stated definitely, the occurrence of gold, other metals or precious stones, does not imply that they can be properly exploited. This question in the case of explored fields can be settled only after proper examination of the local conditions, especially as regard cost and supply of labour, and transport.

COAL AND COAL FIELDS.

BITUMEN AND PETROLEUM, ETC.

For the following matter the author is indebted to the comprehensive report of Mr. J. C. White, the American Engineer, employed by the Brazilian Government in 1904-6 to study the coal measures of the south.

The deductions to be made from this report are, in brief, evident submersion of the coast line from Rio de Janeiro, southwards, indicated by the absence of raised beaches and the depth to solid bed rock, varying from 49-65 feet at Rio de Janeiro, to 320 feet at Pelotas (Rio Grande do Sul). There appears to be no evidence of recent glacial action, but glaciation is considered to have occurred in the early Permian period of geological history. In Santa Catharina the surface of the ground is frequently covered with transported boulders, some of which are ten feet each way, imbedded in the clay slate or killas, far from any outcropping of the granite. On the central plateau, in western Minas Geraes, facettied pebbles are found in large quantities which are facsimiles of similar stones in the dwyka conglomerate of South Africa, in about the same latitude, *i.e.*, 25-35° south. In the four southern states we find limestones of various characters, as well as other metamorphic rocks of pre-carboniferous age.

In Paraná there are Devonian beds of shales and sandy schists passing into massive conglomerates.

At Xarqueadas, in Rio Grande do Sul, on the property of the S. Jeronymo Railway and Mining Company, a deep boring gave the following result:—Shales and sandstones to some 1,000 feet, with 10 centimetres of coal at 275 metres 78 centimetres, and 6 feet of coal below

278 metres 78 centimetres, and veins of 60 cm., 15 cm., 80 cm., and 30 cm. intervening between 278 m. 78 cm. level and the bottom of the boring.

At another trial, 18 kilometres southward of the first, a vein of 13 feet in thickness was found, as well as 14 small ones, totalling 7 feet 3 inches in a depth of 654 feet.

The Rio Bonito beds near Minas, Santa Catharina, have been measured, and correspond as below :—

COAL.

Total depth of boring 190·051 metres; number of veins of coal, 6; entire width of veins, 4·370 metres. Boring was made through clay, shale, and slate. Many other sections were cut in the same field, and veins of coal were penetrated, varying from 30 centimetres to 3 metres in thickness. The total thickness of the narrow veins of coal at Tuberão is about 10 feet.

The Candiota seam at Rio Grande do Sul consists of four veins separated by clay bands. They are 4 feet, 6 feet, 8 feet, and 10 feet in thickness. Below the coal is :—(1) ironstone (hematite) with very high percentage of metal; (2) sandstone; (3) limestone; with veins of calcite (Iceland spar), and deposits of graphite, and mica schist.

The coal measures of Santa Catharina seem to be continued into Rio Grande, and to throw offshoots into Paraná, but these latter are hardly worth attention. The S. Jeronymo Company has a monthly sale of some 1,500 tons at present, and national coal is now being used by the Brazilian Lloyd steamers, and by various electrical works in the south.

A recent discovery of coal has been made in Pernambuco, but no particulars are to hand yet—March, 1910.

Analysis shows the coal (taken from 21 different localities) to be fitted for briquettes more than for use in the ordinary way. Thus prepared it has a fuel value about the same as that of a good class (Anchor Brand) Cardiff briquette.

The conclusion of Mr. White is, that Brazilian coal can successfully compete with that imported, if the former is properly prepared.

A briquetting plant is estimated to cost, ex Köln (Cologne), Maschinenbau Humboldt, £11,466 apart from woodwork and belting and freight. Capacity, 30 tons per hour.

Asphalt (Bofete, São Paulo), from sandstone. Percentage of bitumen very low.

Bituminous shale (Taubaté, São Paulo). A vast sedimentary deposit exists along the river Parahyba, consisting mostly of clays with shales interstratified.

The shales contain 21.41 per cent. of carbon, and have been used for the purpose of gas making, and formerly an oil works was operated in connection.

Boghead (turf) Marahú (Bahia). About 100 kilometres from Bahia city to the south, and in various other places in the same region, a light bituminous shale is found, and it was formerly used to manufacture candles, paraffin and other commercial oils. It contains some 40 per cent. of carbon by ultimate analysis.

Petroleum. No where in the south can this be expected to be found in commercially paying quantities. In North Brazil it may, however, be discovered eventually in the upper regions of the Amazon valley.

Peat, and brown coal (lignite). The first is abundant at Camamú, on the Marahú river (116 miles S.S.E. of Bahia). It is calculated that 400 kilos of combustible

oil can be obtained from each ton of this deposit. There are two great fields of lignite in Minas, one at Gandarella, and the other in the basin of Fonseca.

The basin of Gandarella is ten leagues from Ouro Preto, and six from the station of Raposas (Central railway). The thickness of the mineral is about 18 feet, and it contains 40 per cent. of volatile matter, and 48 per cent. of fixed carbon. 100 kilos produce 22 cubic metres of gas. The second deposit named has never been properly examined, but its richness is somewhat less, having almost 18 per cent. of ashes.

A company is now working at Bom Jardim (Minas Geraes) a deposit of lignite and peat, the latter of which contains 7.5% of ash, 8% of water, and 62% of carbon. Briquettes of very good quality are being produced.

FOSSILS OF THE COAL MEASURES.

The most noteworthy fossil remains discovered in South Brazil were those of *mesosaurus brasiliensis*, a reptile of small size, at its largest not exceeding a metre from tip of snout to end of tail. Many fragments of this saurian were found near Iraty station (S. Paulo Rio Grande Railway), Paraná, in bituminous shales. It was an aquatic creature with a long jaw and numerous fine needle-like sharp teeth, well adapted to enable it to subsist on small fishes. It is considered by Professor MacGregor, of Columbia University, N.Y., to be a new type of proganosaurian. From the Permian rocks.

Scaphonyx Fischeri. This fossil reptile was discovered by Dr. J. Fischer, at Serrilo, Rio Grande do Sul (1902), Triassic age. It is considered to be the first fossil land reptile discovered in S. America which clearly belongs to the fauna of Gondwana Land (Africa). Was examined by Dr. Woodward of the British Museum.

Erythrosuchus. This fossil reptile has been found at Santa Maria (Rio Grande do Sul). This forms another link between the Santa Catharina system of S. Brazil and the Karoo of Africa.

CHAPTER XVII.

Gold and Diamonds.

UNTIL the nineteenth century gold was almost the only mineral mined in Brazil. Minas Geraes is the most important centre of the industry, although this State has been pretty well exploited in a certain manner. The principal mines in operation at the present time are those of Morro Velho (the deepest in South America) which is 4,250 feet in profundity, and Passagem (Marianna). The former has an output of some three tons of gold annually, the quartzites yielding 18 grammes to the ton. This mine has 120 Californian stamps, and is worked by 23 motors and nine steam engines. The Passagem mine is an open working, with three tremendous inclined planes, and employs 80 stamps, crushing 240 tons of ore daily. The average yield is 12 grammes per ton.

The following diagram will give some idea of the geological formation of the district, and of the nature of the rocks in one of the shafts of the Morro Velho Mine (1878):—

BAHU PART OF THE LODE (Morro Velho).*

Depth in yards.

Dip.	25	Mixture of slate and quartz.
	50	Ditto, with iron and copper pyrites, and spathose iron.
	75	Slates.
	100	Massive quartz with bars of slate and Aragonite crystals.
	125	Slates.
	150	—
	175	Quartz, iron pyrites and specks of copper. Cavity, with spathose iron.
	200	Slates.
	225	Large masses of iron pyrites, 225 grains of gold per ton.
	250	Lode traversed by slate, horse of slate with carbonate of iron and white mundic.
	275	350 grains of gold to the ton.
	300	400 grains of gold to the ton.

(* From "Metalliferous Mines and Mining," Crosby, Lockwood, & Co.)

The Serra do Espinhaço for a length of quite 200 kilometres is auriferous. Recent analysis gave an average of 15 to 20 grammes per ton for some 200 deposits.

The Rio Gurupy yields $\frac{2}{580}$ grammes,

Tapera ,, $\frac{4}{900}$,,

Maquiné ,, $\frac{80}{000}$,, in veins of Itabirite.

The average for all Minas Geraes may be reckoned at 12 grammes per ton, and it is calculated that eight grammes will give sufficient profit. It is difficult to point to any particular locality as being worth prospecting, as

the whole of the Espinhaço and its spurs is impregnated. Perhaps the most promising speculation being placer mining by means of dredgers, and hydraulic sluicing of the high banks of gravel left by the old miners in many places. The River Doce (upper portion), Rio de Contas, Pardo, Paraguassu and Itapicurú, all falling into the sea between Espírito Santo and the São Francisco, are undoubtedly worth trying, as well as many of their tributaries. This applies to many rivers in Goyaz and Matto Grosso, and to diamonds as well as gold. The minerals usually associated with gold and diamonds in the deeper gravels, as yet entirely untouched, are porphyries, chalcedony pebbles, black tourmalines, rutile, hematite, magnetite, emery, etc.

In spite of nearly 350 years of mining, hardly a month passes without some new find. At Montes Claros quite recently some nuggets were discovered weighing from 1 oz. to 1½ lbs. The latter was sold locally for £80 15s. At Olhod'Aguaan alluvial deposit was recently discovered, from which £200,000 worth of gold has been taken, including many nuggets of large size.

PROFITS IN GOLD MINING.

The St. John del Rey Mining Company (established in 1830) is still a flourishing concern. The half-yearly meeting was held on December 2nd last, and a dividend declared of 7½ per cent., with almost a definite promise of 10 per cent. this year. Mr. Chalmers, the general manager in Brazil, has been with the Company for the last 25 years, and under his control, in spite of difficulties in getting a full supply of labour, the mine has continued to be a success.

DIAMONDS.

Diamonds were first discovered in Brazil in 1723 near

Diamantina (Minas Geraes). A Portuguese who had been in India was staying in the district, and saw the stones used as counters for card playing. One fine morning he was absent, and the whole of the shining crystals he could lay his hands on with him. Bernardo da Fonseca Lobo, his host, surmised the secret of his guest's precipitate departure, and speedily followed suit, and proceeded with a store of gems to Rio de Janeiro, and thence to Lisbon. The Portuguese Government rapidly imposed the most rigorous conditions for the exploitation of the industry, and all free men were banished from the region, except those who were charged with the supervision of the slaves, and the protection of the convoys. In 1732 no fewer than 40,000 men were employed in the state of Minas, and from 1730 to 1771 Brazil exported 1,666,569 carats, worth £3,600,000.

The discovery of a stone of 18 carats sufficed to purchase the freedom of a slave. The famous *Estrella do Sul* (Star of the South) was found at Bagagem by a negress engaged in washing clothes. This stone weighed $254\frac{1}{2}$ carats, and when cut 125 carats. The Dresden (cut) $176\frac{1}{2}$ carats, and the *Coroa do Portugal* 120 carats. Quite recently a gem of the first water and weighing 18 oz. was discovered at Dos Douradas (Minas). This stone is reckoned to be of the finest ever found. Another fine stone adhered to the roots of a cabbage, and yet another amongst the rubbish on the floor of a miserable cabin. In 1906 the total value of diamonds and boart and carbonates exported was £120,000. Brazilian stones are considered to be 50 per cent. superior to those of the Cape. This is largely due to the constant attrition they have gone through amongst the river gravels, thus removing all impurities, and incidentally providing for the survival of the hardest and most flawless stones. The

largest piece of boart ever discovered came from Bahia in 1895. It weighed 3,078 carats, and at present prices would be worth £50,000. Boart is frequently found in pieces of 100 carats.

The diamond has been found in Brazil between 16 and 26 degrees South Latitude, but it is very difficult to lay down a hard and fast law as to its occurrence.

DIAMOND FIELDS.

DIAMANTINA (MINAS GERAES).

Diamantina city is 800 kilometres N.W. of Rio de Janerio, and 250 miles in direct line from the coast. The elevation of the mountain range is from 3,500 to 5,700 feet, and it is situated at $18^{\circ} 29'$ south, and $43^{\circ} 30'$ west. The river beds are at an average altitude of 3,500 feet. Diamantina will shortly be reached by a line of rails from Victoria, and by an extension of the Central Railway on its N.E. branch. Here are the head waters of the Jequitinhonha, Arassuahy and Doce rivers, and many other streams. Diamantina has several lapidaries, and is the largest and most prosperous city in the district.

At São João de Chapada, four leagues from Diamantina, the diamonds have been washed out of the rock itself, or rather out of the decomposed strata, consisting of sandy schists, and clays coloured by oxides and carbonates.

At Grão Mogul, 100 miles N. of Diamantina, the gem was sought for under the same conditions as the above, and it was found always in the itacolumite (flexible sandstone) series.

Abaeté and Somno rivers. Here the beds are alluvial, or rather river gravels, and the recent tests have yielded $\frac{1}{8}$ th to $\frac{1}{4}$ carat per cubic metre in the stream washings, at easily accessible depths.

The deposits above water level have also proved worthy of attention. The Abaeté river is some 170 miles long, and varies in width from 200 to 500 feet. Its course is between the Serras Canastra (east) and Matta da Corda (west). The cascalho (gravel) contains jaspers, garnets, gold platinum, osmium, and iridium, besides some 30 other minerals, more or less rare. The Somno flows into the Paracatú, and has a total length of 140 miles. The table lands consist of itacolumite and schists, containing sand and clay. The upper series is a grey weathered sandstone. The formation in the Somno gravels consists of pingos d'agua (rolled quartz pebbles), jaspers, black tourmaline, limonite, rutile, kyanite, martite, and gold, and abundance of garnets. The whole of the rivers in this district, and the small plateaux between, are diamondiferous, and contain gold in connection, in almost every case.

BAGAGEM AND AGUA SUJA.

Bagagem is eleven leagues from Araguay (terminus of the Mogyana Railway, São Paulo), but it is situated in Minas Geraes on the river Bagagem, a tributary of the river Paranyba. The elevation of the country is from 2,500 to 3,500 feet. The distance from Diamantina is 250 miles, and it is situated in latitude $19^{\circ} 50'$ south and $47^{\circ} 30'$ west. Here the Dresden diamond was discovered, as well as the Estrella do Sul. Agua Suja is some twelve miles from Bagagem. The geology of the district consists of schists with granite dykes, crossed by quartz veins, overlaid by level beds of sandstone, having layers of trap intercalated. In conjunction with the diamonds here, are staurolite, rutile, anatase, tourmaline, phosphates, mica, garnets, and pingos d'agua. A large diamond has been found at Uberaba, 60 miles from Bagagem. This

town is accessible by rail. The Bagagem and Agua Suja fields have been almost abandoned for many years now.

SÃO PAULO DEPOSITS.

Diamonds have been found in the streams flowing into the Paran , at Franca, and on the river Verde.

PARAN .

A few stones have been taken from the Yapo and Pitangru rivers, tributaries of the Tibagy river, Campos de Guarapuavas.

CANNAVIEIRAS DISTRICT (SALOBRO).

The route is by steamer to the river Pardo from Bahia, and thence 56 miles by canoe to Jacaranda, and from there by mule four leagues to Salobro. The diamonds are found in cascalho, some feet below a whitish clay deposit. The alluvial has to be removed to a depth of some 15 feet to get at the gravels, and although the wet season causes work to stop, in the dry one there is frequently insufficient water.

Matto Grosso. Amongst the conglomerates, as usual in the Brazilian deposits, occur diamonds in most of the rivers, but as a secondary feature in this state, gold being the most frequently found of precious minerals. The residues after washing, contain sapphires (azulinhas) zircons, chrysoberyls, rutile, magnetite, and chromite.

Goyaz. Although it is known that many of the rivers in this state are diamondiferous, no considerable finds have been made, and very little prospecting done.

Itapicur  (Bahia). This river has been the source of a somewhat extensive discovery of fine stones during 1908-9, and it is presumed that the field is a continuation of the great Chapada Diamantina, of Central Bahia.

THE DIAMOND FIELDS OF CENTRAL BAHIA.

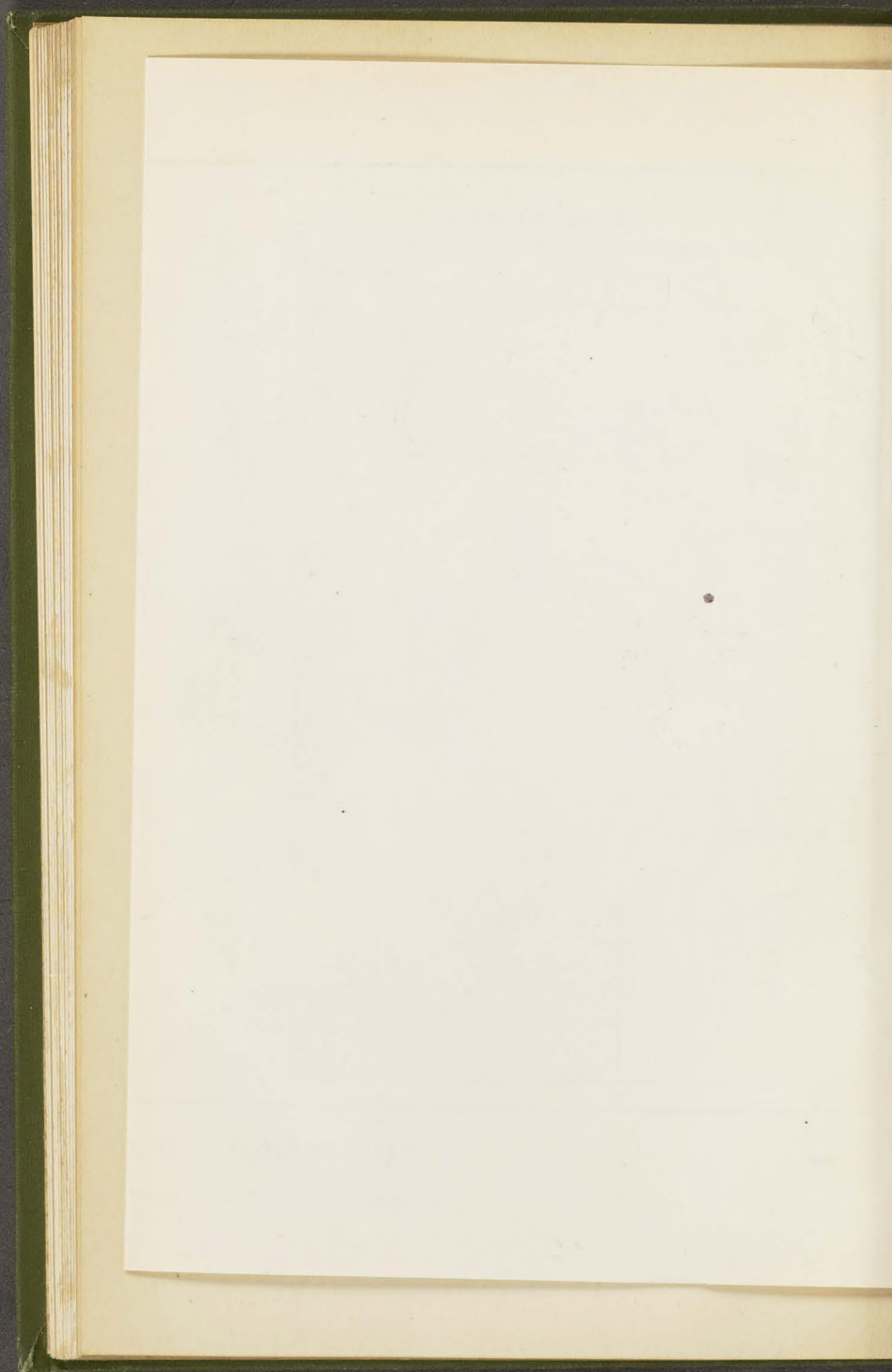
The Lençoes and Sincora fields are reached from Bahia, either by rail to Queimadas, and thence to Joazeiro on the upper São Francisco river, and so by mule the rest of the journey, or by steamer to Cachoeira across the bay, and on to the present rail head at Bandeira de Mello, about 254 kilometres due west. From this latter place a fairly well beaten track leads to the diamond district through scrubby second growth called catinga, and although the climate is hot, it is as fine and healthy as can be found.

The matrix according to Professor Branner appears to be quartzite, with nearly vertical beds, whilst the country rock is composed of granite, gneiss, schists, and old eruptives. The series containing the diamonds, besides the quartzite comprises itacolumite and conglomerates, and the total thickness of the formation is about 2,200 feet. The matrix is of carboniferous age. Dr. Branner has the credit of being the first to study the geological sequence of the rocks of central Bahia, and his discoveries are of the greatest value from the point of view of economical exploitation of this diamond field. Strange to say, although the derivation of the gem may be said to have definitely ascertained, yet very few prospectors have seen the stone in situ, almost all the diamonds are found in the debris in the streams, the conglomerate in the dry diggings, or in the banks of the rivers, or in pockets below the gravels in the bed rock. Though the most elementary methods have been employed for centuries in winning diamonds, yet the search in all easily accessible localities has been so thorough (as far as the surface gravels are concerned), that it is only in the most

out of the way places that the ordinary prospector can expect to find a bonanza. Dr. Branner says that the pink quartzites are the main beds, and the streams rise and flow through these rocks everywhere in the Bahia field. The theory is that (according to geological evidence) the gems come from these (lavras) beds. A glance at the first map will show the principal centres. It must be noted that no eruptive rocks occur in direct connection with the lavras, and therefore the diamond cannot be derived from the former. There is, however, a remote possibility of their having originated in peridotites of the old crystalline series, and finding their way into their present matrix after several geological periods, favour the hypothesis that the latter is their original place of creation.

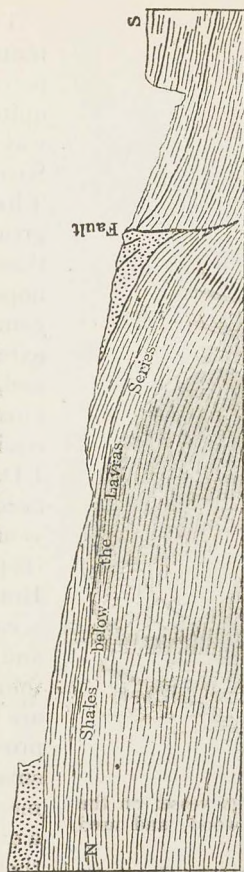
Recognition of the diamond bearing formation determines the area in which the gems may be found, or at least in such quantities as would pay for exploitation on a large scale. The most productive area up to the present lies between Sincora on the south, and Morro do Chapéu in the north. This may be due to one of two reasons, either the richness of the deposits, or to the abundant water supply. The stones are not confined to any particular part of the lavras. At Morro do Chapéu they are found in one section of the series, and at Lençoes and Andaraí in another. The photograph taken at Mosquitos shows a sharp line of demarcation between the upper (productive) beds, and the lower (barren) ones. The deposits are in all probability the richest, in the hitherto unworkable swampy districts, where dredges would be necessary to deal with the gravels buried beneath 20, 30 or more feet of sedimentary deposits and water. It should be also noted that for many years prior to the discovery of the value of the black or amorphous

variety, these stones were thrown away, and found a resting place in these very alluvials. Above Bandeira de Mello, boats may be used on the Paraguassú river, and the railway will soon be extended to Andarahy and Lençoes. It is interesting to note that the white and highly coloured stones have their angles straight, and neutral tinted gems rounded outlines. Most stones possess a rough skin or coating. A curious fact may be noted with regard to first quality stones, and that is, that one or two of their faces bear triangles. Diamonds are found in Brazil in blue, green, orange, puce, pink, black, and red. A splendid specimen of the latter, a shade between the pigeons' blood hue of the fine ruby, and the cherry red jacinth, made its appearance on the London market in 1909. Its weight was only $2\frac{1}{4}$ carats, but it fetched the sum of £3,000. This unique gem was found many years ago, and not being known by the great dealers, its appearance in the sale room caused some little struggle for its possession.





Section across Pico Nabuco, showing diamond bearing beds at the summit, and caboclo shales below.

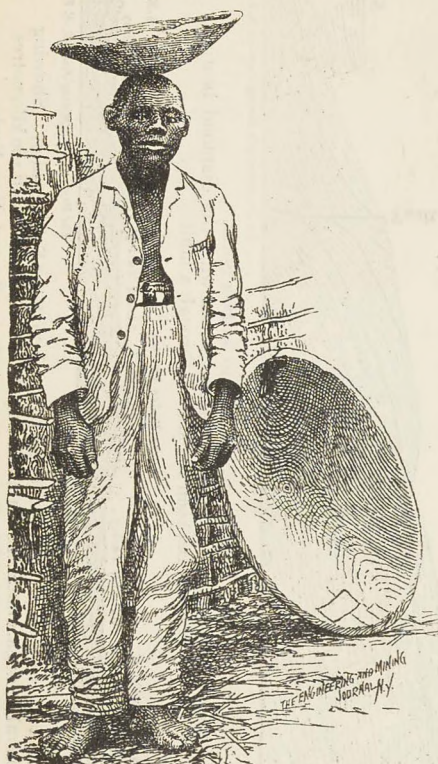


N.W. section across Riachão da Boa Sorte, Sitio Cachoeirinha, near the village of Alagoinhas, showing the diamond bearing strata between the shales, through a fault.



Section N.W. to S.E., from the river São Francisco to the Salitre valley. Showing the general geologic character of the country, for a distance of about 160 kilometres. (By the courtesy of *The Engineering and Mining Journal, New York*).

Method of Winning Diamonds in Brazil.



The Batea. The large vessel on the ground, made of hard wood, and used for washing the gravel.

The smaller bowl, that on the man's head, is used to convey gravel from one place to another.

The diamond industry in Brazil is carried on in quite a different way to that of South Africa. There are no great companies that hold a monopoly of the gems in a very extensive area; and, of course, there are no equivalents of the I.D.B. laws; indeed, such a thing would be quite impossible in Brazil. A license is easily obtained, and the whole of the diamond fields are full of isolated prospectors, and small groups of men that have amalgamated their capital.

They use the following simple tools:—A batea, or basin of hard wood, in which the

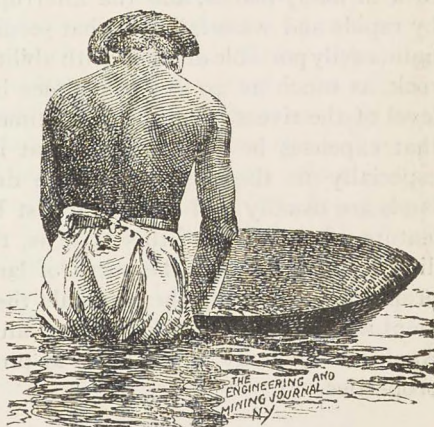


Washing for Diamonds and Carbonados.
(Bahia district.)

gravel is washed; a carimbé, similar to the batea, but smaller, and used to carry earth or gravel to a distance when water is not available on the spot. The other implements comprise a crow-bar, a scraper or hoe, and a scoop for clearing out holes, as well as

a hammer to break up the masses of conglomerate.

Some of the miners dive into pot holes, taking down with them a small canvas bag extended by an iron ring. They fill this with gravel and rise to the surface, continuing until sufficient material has been accumulated to last them for some time. Those more up to date employ a primitive sort of diving-suit, or even an old-fashioned



Washing for Diamonds and Carbonados.
(Bahia district.)

kind of diving bell. In this case, one or more canoes are employed, Where sufficient capital is available, the bed of a stream is turned, and a dam constructed.

Storekeepers sometimes make advances and supply provisions, tools, and other necessities. Others buy claims, and secure perhaps 25 per cent. for allowing more impecunious miners to do the rough work. They take good care, however, to wash the pay-dirt themselves, or to entrust this to those in whose good faith they have confidence. Travelling merchants buy up stones here and there, but most of the trade is done in Bahia. The bulk of the gems go to France, Germany, and the United States.

In Matto Grosso and Minas Geraes several dredgers and elevators have been at work during the last two or three years, but results have not been divulged. The great difficulty to combat is the immense depth to bed rock in many places, and the interruption to navigation by rapids and waterfalls. What seems to be needed is a light, easily portable dredger, with ability to go down to bed rock, as much as 40 feet sometimes below the ordinary level of the rivers. At the same time it is a *sine qua non* that expenses be cut down, as that is a very big item, especially in the case of a large dredger. In Bahia lands are usually sold to the highest bidder. One good feature of the laws of this state is, that in the case of disagreement between the owner of land and a company proposing to exploit the minerals thereon, the Government acts as arbitrator, fixing the value of the property. Again, no one may refuse leave to prospect undeveloped properties.

CHAPTER XVIII.

Other Minerals.

AGATES. The best are found in Rio Grande do Sul, as rounded pebbles in the rivers. Every variety is encountered, including beautiful crocidolite (tiger eye), carnelians of the deepest hues, and onyx and sardonyx in abundance.

Amethysts. Found in many states, even within a few miles of Rio de Janeiro, in the decomposed rocks of granite base. Principally found in Bahia, Minas, Minas Novas and Rio Grande do Sul, where the great drusy cavity was found by German agate seekers, 15 tons were taken out and exhibited at Dusseldorf in 1902, the crystals were an inch long, and of the finest violet colour. The mass was found in the coastal range, at 2,000 feet above sea level. Amethysts are sometimes picked up at the mouth of rivers in Rio and São Paulo States, and a block was sent from Brazil to Calcutta which weighed 98 lbs. Amethysts have been found half violet half yellow, now and then they have been found on the sea shore, near Santos, and in quantities at Itaberava (Ouro Preto) and at Bom Jesus das Meiras N. E. Minas Geraes.

Andalusite. In fine crystals and rolled pebbles at Minas Novas.

Aquamarine (blue beryl). Found in veins of coarse-grained granite, penetrating gneiss at Vallongo near Rio de Janeiro. Abundant in some parts of the Arassuahy

river and tributaries, N.E. Minas, where frequent green crystals are found which rival the finest emeralds. Recently two beautiful specimens were discovered, one weighing $4\frac{1}{2}$ lbs., and the other six. In 1908, a mas was brought to light in the same district which turned the scale at 40 lbs. They are found in pegmatite veins which are partly decomposed, or in the debris resulting from disintegration of the matrix.

Asbestos. Very fine qualities found in many States. The best known locality is Taquaral (Ouro Preto).

Beryl. The best are found in the river beds in the Arassuahy district. They are encountered in many different colours, and sometimes perfectly colourless. When found in situ, it is in pegmatites and mica schists.

Bismuth (radio active). Found as a sulphide, combined with uranium, at Encruzilhada (Rio Grande do Sul).

Chrysoberyl and Cymophane (cat's eye), yellow green, golden yellow and brown. Both varieties are found in the Minas Novas district, in pebbles not larger than a bean, in auriferous clay or gravel derived from weathered rocks, mostly in the rivers Piahy and Calhão.

Cinnamon Stone. See Grossularite (Garnets).

Copper. Pyrites and native copper is found in the form of malachite and chrysocolla at Carnahyba, in central Bahia. It contains some four per cent. of pure metal, but the deposit (as yet unworked) is presumed to be a very large one.

There are other well known deposits at Camaquam (Rio Grande do Sul). The mineral occurs here in gabbro and sandstone. Four veins have been worked, and the copper concentrated on the spot to 28 per cent. Each ton of the ore is calculated to contain 30 grammes of gold. In 1906 $1,483\frac{3}{4}$ tons were exported.

Chrome. Crystals of chrome and chromite of lead are encountered in micaceous schists at Congonhas do Campo (Ouro Preto), as well as chromate of iron in the serpentines of the same state (Minas Geraes).

Epidote. Found in argillaceous schists in many parts of Brazil.

Flour Spar. Rare.

Garnet. In quartzose rocks, and in gneiss, in almost all the States of Brazil. Was formerly to be picked up on the beach quite close to Rio, in the form of water worn grains. Is common in Minas Geraes, being found at Minas Novas in company with andalusite, cordierite, pink quartz, aquamarines, blue and white topazes and red and blue spinels. Grossularites, pyropes and almandines occur in the rivers S. Antonio, Andarahy, Piabas, etc.

Arsenic. In Minas do Rio de Contas and Cannabrava (Bahia).

Calamine. See zinc.

Cadmium (Greenockite). At Santa Luzia and Bomfim (Bahia).

Emery. In São Paulo, not more than 35 miles from the city of that name. The locality is called Matto do Paiol, and is reached by the Sorocabana railway. The matrix is a micaceous clayey schist in advanced decomposition, and surrounded by granitic and calcareous rocks. The mass contains at least 70 per cent. of grey-blue mineral, in lenticular blocks, some of which are more than two yards cubical.

Euclase. This rare gem is found at Boa Vista (near Ouro Preto), and at Minas Novas (Minas Geraes).

Graphite. Abundant in Minas, near Ouro Preto, Marianna, Santa Barbara, etc. Near the Jequitinhonha River it is in veins varying from 19 to 40 inches thick, some masses weighing several hundred pounds. The

percentage of carbon in this deposit varies from 50 to 85. It is not being worked at the time of writing—March, 1910.

It also occurs at S. Fidelis, in the State of Rio de Janeiro, in a deposit containing 83 per cent. of carbon. This mineral also exists in various small pockets in Bahia, and I have found isolated pieces between Cascatinha and Petropolis (Serra da Estrella.)

Hyacinth (Rubicelle). In Minas Novas, in pebbles of a reddish yellow tint.

Indicolite (blue tourmaline). At Inhambupe, Jacobina, Angico, and Feira de Santa Anna, in Bahia; also in the Arassuahy district of Minas Geraes.

Iolite (dichroite or cordierite). This curious gem forms one of the numerous group of precious and semi-precious stones found in company at Minas Novas. It is called water sapphire in Ceylon, and is discovered in various shades, from greyish white to lavender blue.

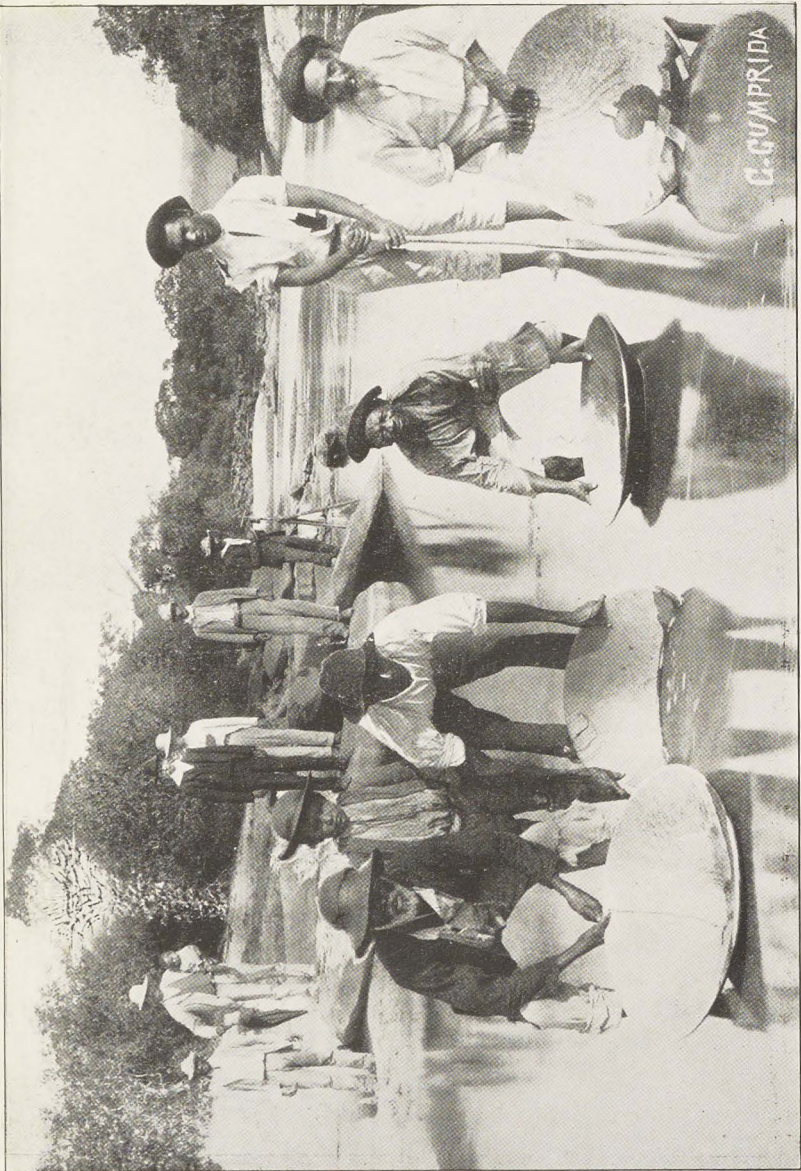
Jasper. At Areia (Bahia), and in many places in Minas, Rio Grande do Sul, and other states.

Kaolin (china clay). Common in many parts of Brazil.

Lithographic Stone. At Bom Jardim, Carinhanha, and other localities in Bahia, also in Minas Geraes.

IRON.

Iron exists in every state in Brazil. In São Paulo, Paraná, Santa Catharina, and Rio Grande do Sul the ores are magnetic; in Goyaz, Minas Geraes, Bahia, etc., they are usually hematites. The Minas Geraes field is crossed for 90 kilometres by the Central Railway, between Layfayette and Miguel Burnier stations. The Leopoldina Railway is now only some 80 kilos from the great outcrop at Itabira do Matta Dentro, and the French line from Victoria (Espírito Santo) is expected to



PREPARING TO WASH GRAVEL IN THE BATEAS, MINAS GERAES.

By the courtesy of H. Pearson, Esq.

DIAMOND WASHING, JEQUITINHONHA RIVER, MINAS GERAES.
By courtesy of the Diamond King Mining Company.



reach there in a year or two. This company has installed special equipment with a view to dealing with the mineral traffic. The hematite is known as itaberrite, and by erosion the ores have been divided into three classes :—(1) The hard metal outcrop ; (2) loose rubble mixed with quartzites ; (3) ferruginous sands in the valleys. Minimum quantity of ore, judging from visible deposits :—2,000,000,000 tons. One block, containing 20,800,000 tons of rubble, carrying 50 per cent. of iron.

Analysis at Krupp's Works (Essen), and the United States Steel Corporation's Laboratory, gives :—Phosphorus 0.0024 per cent., silica 1 to 3 per cent. The whole of the 52 outcrops surveyed by the Government mining engineers are reckoned to contain not less than 12,000,000,000 tons of ore of the highest possible grade. This is in one district only (Central Minas Geraes). A small iron-works (Usina Esperança) has been in operation a long time now, and producing 6 tons of metal daily, makes a profit of 44 francs per ton.

In Paraná there is an immense deposit of ore at Bom Retiro do Mundo Novo (Antonina), which is situated only 3 miles from a sea-port accessible to vessels of 300 tons burthen. The quantity of ore is calculated as 6,000,000 tons, and it is 67 per cent. pure iron. Exportation from Brazil, 1908, 358,595 tons.

THE FUTURE OF THE IRON INDUSTRY.

The Victoria-Diamantina Railway Company has concluded contracts with Bessemers and other steel companies, to furnish at least 2,000,000 tons of ore annually. Analyses made in ten English and German laboratories give 70 per cent. of pure iron in the hematites of Minas Geraes. The whole of the Railway will be electrified in three years by Dick, Kerr, & Co., falls on the River

Doce furnishing ample power. Contracts have been made also with four steamship companies, who have undertaken to reduce the coal freight 50 per cent. Transport of the ore to ship's side will cost 8 reis per ton per kilometre, or 1s. per 100 kilometres.

LEAD.

In Minas, galena is found in calcareous, or in quartz veins, and is almost always argentiferous. It occurs near Diamantina, Caethé, and Sete Lagoas, and Montes Claros, and in Abaeté. This latter deposit has been tested, and gave 40.25 per cent. of lead, with about 6 ozs. of silver to 200 lbs. of metal. The richest sample yielding $8\frac{1}{2}$ ozs. of silver, per 100 kilogrammes. It is also found in the State of São Paulo, in small quantities.

MANGANESE.

Manganese ores in Brazil average 45 per cent. of mineral of commercial value, but they are remarkably free from sulphur and phosphorous. Exportation reached the amount of 220,021 tons in 1907. There are two important mines now being worked, one near Queluz having a reserve of at least five million tons.

As freights are now, the expense of putting a ton on the European market amounts to about £2, and strong efforts are being made to induce the Central Railway to lower its tariff 2s. 6d. per ton. From Queluz to Rio de Janeiro (500 kilometres), the rate was 7s. 6d. in 1903.

A deposit has been discovered at Goyanna in Pernambuco State, and there is a very large amount in various parts of the Chapada Diamantina of Bahia. It is in the form of Psilomelane, and the Serra de Jacobina is also rich in this mineral. Villa Nova, near which the deposits occur, is 444 kilometres from Bahia. There are also

large quantities near Nazereth, quite close to the city itself. It is also found in some parts of the States of Rio and São Paulo.

Marble. Very fine pure white, rose, and onyx coloured marbles are worked in Minas, and Rio States, and the Bahia Chapada is noted for this mineral, which exists in vermillion, straw, and bluish black. Onyx and brecciated varieties abound, but are not worked as yet.

Mercury. Cinnabar is mined at Tripuhy, near Ouro Preto, in a crystallized form, and it occurs also at Itajahy (Santa Catharina), and at Cangussú and Jaguarão in Rio Grande do Sul (in metallic form).

Ochre. Red and yellow ochre is abundant near Ouro Preto, St. João del Rey, and St. José del Rey and Prados, and most of the material extracted is used in Rio and São Paulo by local paint works. In the shales of the Chapada, ochres are quite common, especially in the Almas and Calmon valleys and between Morro de Chapéu and Lençoes.

Mica. Found everywhere, Goyaz having produced the best quality up to now. There are mines in the State of Rio itself, and in Bahia, near Jacobina, pegmatite dykes contain beautiful crystals. It is also encountered in the Itapicurú valley, and close to the Paulo Affonso falls.

Molybdenite. Found in quartz veins in Paraná, and in small quantities in other States. I have seen some tiny flakes on quartz, from a quarry at Villa Isabel (Petropolis).

MONAZITIC SANDS.

These extend from the south of Bahia to Espírito Santo, and the whole of the exportation is in the hands of two contractors, Mr. John Gordon, working the Prado deposit, and Herr Israelson (representative of a German

house), with locations near by. Between these two concessions there are, however, other deposits as yet unworked. In 1907, the first shipped to Hamburg 7,515 tons, and the second 9,075 tons. There is a working agreement between the two, to fix the price at £5 15s. per cent. of oxide of thorium, and to divide sales. Thus the value per ton of sand is £28 15s. The stock in hand is, however, in excess of the present annual requirements.

There are now in Rio two small factories making incandescent mantles, using the local monazite. These sands contain—

Cerium	...	...	62.10	per cent.
Thorium	...	...	1.5—15.0	„
Yttrium	...	...	1.0—3.0	„
Lantharium	...	...	2.5	„
Iron	...	...	2.5	„
Aluminium	...	...	3.0	„

According to Professor Lacroix, of Paris, iridium should also be contained in these sands.

Nickel. Found in Santa Catharina, and Minas Geraes (as pyrrhotine), and very sparsely in hematites and other iron ores.

Platinum. In small quantities in many rivers in Matto Grosso, Pernambuco, Minas (in the Abaeté river, and its tributaries, and in the Marianna district, always associated with gold), also in the State of Parahyba do Norte.

Palladium. Exists in the itabirites. In the Gongo Soco mine it has been found in small quantities, in the gold bearing strata.

Petroleum. A deep spring has been discovered at Ibitinba (São Paulo). The oil is evidently from a great depth, and the pressure immense, as a column of fluid is thrown up to a vast height.

Rock Crystal. Common in nearly all the states, abundant at Congonhas do Campo. The finest is, however, found in the Serra dos Crystaes, close to the boundary of Goyaz. Most of the mineral is exported via Uberaba. Sete Lagoas and other places send small quantities to Rio. Rose quartz is encountered in the Jequitinhonha river, and in the surrounding parts of Bahia and north-east Minas. Yellow crystals (citrine) or false topaz, cairngorm, is very common.

Salt. Along the coast in many places, especially at Cabo Frio (near Rio), and in the Chapada of Bahia (salitre district).

Saltpetre. The principal source of this mineral is in the Chapada, in an area of some 12,500 square kilometres in the limestone and shale.

Sulphur. The only known deposit of importance is at Curraes Novos, in Rio Grande do Norte.

Stibnite. With bismuth at Forquim, in contact with gold, and at Passagem do Marianna. Antimony (native) is found in the valley of Itapirapuan in São Paulo. Stibnite in crystals is also existing in the auriferous deposits of Caethe and near the peak of Itabira do Campo, both places in Minas Geraes.

Sapphires. Hitherto the existence of the real sapphire has been entirely unknown to the jewel merchants, and it is quite possible that in the future the ruby and the true emerald will be found in Brazil.

The sapphires that are found in the Coxim River, in Matto Grosso, are small and somewhat cloudy, but abundant. The alluvial clays and detritus of Cannaieiras (Bahia), the sands of the River Doce, and the Sapucahy Mirim (near Garimpo das Canoas), at Salobro, all contain this gem, and it is now reported that it has been found in the State of Rio de Janeiro itself.

Spinel. Many beautiful spinel and balas rubies are found in the sands of the River Piuna, in Espirito Santo, and in the Paraguassú River near Machado Portella. Amongst their hues are crimson, flame red, violet, and blue.

Sphene. Small green crystals in the Minas Novas district.

Spodumene (triphane). Found at Arassuahy, and is sometimes sold locally in mistake for Chrysoberyls.

Talc, and soap stone. Common in Ouro Preto, Santa Barbara, Marianna, etc. Many Brazilian churches have fonts and other ornamental vessels, and parts of their structure made of this stone, which is of an excellent variety.

Tin. Stream tin in grains in the rivers in Minas, especially in the Mucury, and at Salinas, and in Rio Grande do Sul. Cassiterite (tin stone) occurs at Sanga Negra and Caçapava (Rio Grande), with most of the elements peculiar to monazite.

Topaz. The yellow and orange-hued topaz is principally mined in a range of hills close to Ouro Preto, in itacolumite and clay-slate (killas), penetrated by decomposed schists and quartz veins. It is also to be found in Rio Grande do Sul. The pink and yellow variety is rare, and at Minas Novas the white kind, called by the name of the locality, or when rolled, pingos d' agua (drops of water). This stone is called, in Ceylon, matura roses when cut rose fashion. At this place is also found the valuable indigo-coloured topaz.

It is also found in the debris derived from the wearing down of granitic rocks. It is now known to exist in the State of Rio. A wonderful topaz was recently offered to the Brazilian Government. It weighs two-and-half pounds, and was presented originally by Dom Pedro to

Pope Pius the IX., who gave it to the King of Naples. The celebrated Cariello was given the work of engraving it with the figure of Christ in the act of breaking the Eucharist bread. The work is of the most delicate description, and took 12 years to complete. The price asked is £40,000.

Tourmalines. All the north east of Minas is noteworthy for this gem. Green ones have been picked up in the Ribeirão da Tolha, near the Chapada, and fine blue, yellow, pink, white and purplish crimson (rubellites) stones at Minas Novas. A green one from Larangeiras weighed nearly a pound. Some are encountered with pink centres and green outsides, but probably the rarest stone ever discovered, has just been presented to the President of Brazil. Appropriately it has a green centre and a yellow surrounding. I have, in my small collection of Brazilian stones, tourmalines in green, pink, blue, brown, yellow and white. I think that it is safe to say, that this fascinating jewel may be found in every possible hue, ranging from golden orange to sapphire blue.

Wolfram. Encountered in Rio Grande do Sul, in the municipality of Encrusilhada. The veins are of quartz, from 12 to 20 inches thick. In the same veins are found copper sulphide, and monazite in the streams. The proportion of acid is 40 per cent.

Zinc. Sulphuret (or blende) in the granitic rocks of Parahybuna, and also with argentiferous galena in Abaeté.

GENERAL REMARKS.

Enough has been said to show that there is a good opening for Brazil in the diamond mining districts. Only a very small portion of the alluvium has been explored. Most of the river gravels (untouched at 20 to

50 feet below the surface of the water) contain enough gold to pay for dredging. One dredge, started in the Diamantina district, digs to a depth of 50 feet, and the buckets are able to cut into the bed rock (a soft sandstone) to four or five feet. The expense of running is £6 daily, handling 1,000 yards of gravel. Quoting from the statement of the operators, the affair is a great success. With regard to the new law of Bahia, the proprietor of mineral lands is obliged to work them, or submit to Government arbitration, with regard to their sale. No license is required to prospect with movable plant, and concessions may be readily obtained of reaches of public rivers, up to 50 kilometres. All diamondiferous soil being state property, no litigation can arise through the question of ownership. A license for placer work costs a few milreis only. To quote the British Consul at Bahia. The new regulations are well calculated to encourage exploitation of this, the richest zone in Brazil. The laws seem to have been based on the best features of those elsewhere. The taxes payable are from $\frac{1}{2}\%$ to 10%. In the case of monazitic sands they are very heavy, but the profits afford sufficient recompense for this impost. To sum up, most of the abandoned properties were discarded for want of sufficient capital, or were failures through bad management. Legislation has been effected to protect prospectors, and to guarantee to them the result of their labour. The climate is excellent, and quite suited to northern Europeans. Registration and survey is obligatory, and no one can now pretend to ownership of a claim who is not possessed of properly stamped documents.

There are (1909) some 66 British Mining Companies owning properties in Brazil, and the capital involved amounts to over £8,000,000.

THE END OF THE WORLD

1914

PRECIOUS STONES IN THE STATE OF BAHIA.

Agates, amethysts, almandines, andalusites, aventurine, beryl, boart, chalcedony, carbonado, cinnamon stone, citrine, corundum, cornelian, diamond, grossularite, heliotrope, indicolite, jasper, onyx, pyrope, rose quartz, sapphirine quartz, rubellite, sapphire, topaz, tourmaline and zircon.

Metals. These include gold, platinum, copper, iron, manganese and zinc.

MINERAL EXHIBITS AT THE GREAT EXPOSITION AT RIO DE JANEIRO, 1908.

Amazonas. An assorted exhibit.

Pará. Graphite, pumice, emery and gold.

Matto Grosso. Gold, diamonds, rock crystal, iron, manganese, copper, ochres and soap stone.

Goyaz. Crystal, graphite, magnetite, mica, asbestos, talc, marble, diamonds and gold.

Maranhão. Gold, marble, crystal, ochres and kaolin.

Alagoas. Marble, talc, iron and crystals.

Bahia. Marble, mica, monazite, graphite, etc., and a collection of 1,400 diamonds.

Espirito Santo. Monazitic sands.

Minas Geraes. More than 200 different kinds of minerals, including a magnificent display of gem stones.

São Paulo. Coal, ochre, talc, kaolin, and some minor precious stones.

Paraná. Iron.

Santa Catharina. Coal, iron, etc.

Rio Grande do Sul. Agates, amethysts, onyx, coal and copper.

For explanation of technical and local words, see Glossary at the end of book.

CHAPTER XIX.

Thermal Springs and Tourist Resorts.

PARA. Near the City of Monte Algere there are hot sulphur springs that have never been analysed or tapped.

Parahyba do Norte. At St. João do Rio do Peixe analysis has been taken of some waters lightly sulphurous, and with a temperature varying from 21.5 to 32.2 centigrade.

Ceará. Close to Tamboril there are acidified crystalline springs entirely unused. Another in the vicinity of Santa Quiteria has a temperature of 35° centigrade. The most important springs are at Caldas.

Pernambuco. Mineral waters are found at Pajehú de Flores.

Bahia. Close to Itapicurú, 220 kilometres from the capital of the state, there are thermal springs, with a temperature of 39° centigrade. They contain chloride of sodium, lime and magnesia, sulphate of soda and bicarbonate of soda, carbonate of lime and magnesia. Four parts out of five are of the first named. There are seven other hot springs of a similar nature in the vicinity of the above.

There are also thermal springs at Santa Luzia (Caetite), Morro do Chapéu, Jacobina and Abbadia.

Rio de Janeiro. In Parahyba do Sul there is a mineral spring, classified between bicarbonates and ferruginous effervescent types. It is a proto-thermal fountain. It is under the name of Salutaris, and is prescribed by the local doctors for anæmia, dyspepsia, and female irregu-

larities. In six years, 49,307 boxes of 48 small bottles were sold in different parts of Brazil. In Santa Rita (Magé) there is a spring of water, very good indeed for affections of the liver and stomach. Of this, in the first three months of 1907, 43,930 bottles were sold.

Federal district (municipality, etc., of the capital of the Republic). Formerly there were many ferruginous springs (chalybeites) in Cosme Velho, Santa Theresa, Tijuca and Boa Vista da Gavea, but the growth of the city has, so to speak, swallowed them up.

São Paulo. In Tatuhy a spring furnishes 3,000 quarts in 24 hours. It is largely impregnated with carbonic acid and gas. In Santos there are several mineral springs, and in Campinas six of gaseous nature, as well as others in different parts of the state, as Leme, Rocinha, Mogy-Guassu.

Paraná. The hot springs of Xapécó are of sulphurous nature, and are mostly used for affections of the skin.

Santa Catharina. In this State, at Pedras Grandes (Tubarão) there are waters with a temperature of 41° centigrade, and very valuable in cases of rheumatics, and contagious skin complaints. There are three other springs of a similar nature in the same state.

Rio Grande do Sul. The principal spring is at S. Gabriel, and consist of carbonates and ioduretes of iron. Four parts out of seven are ferruginous.

Matto Grosso. From the granite, at a place called Frade, water gushes at 42°c. of heat, of a ferro-manganese nature, employed in cutaneous diseases.

Goyaz. In the Serra das Caldas there are three thermal springs, varying from 22° to 42° centigrade, of the same nature as the above. Experiments prove them to be minus acids or alkalis. They are frequented by persons suffering from rheumatics and skin complaints.

MINAS GERAES.

Aguas Virtuosas de Caxambú. Caxambú is in the municipality of Baependy, situated about 2,800 feet above sea level. The mineral springs have been noted for a long time, and their reputation has increased so much that there is now quite a small town in the locality, with hotels, electric light, baths, etc. Nearly 100 persons are engaged in the bottling of water from five or six springs, others being used locally only, for medical purposes.

The use of these waters cures indigestion and constipation, diabetes, etc. Character of fountains D. Pedro and Viotti, gaseous acidulated waters like seltzer. Fountain D. Isabel more gaseous, and contains a large percentage of iron, tonical. Fonte D. Leopoldina, more alkaline and gaseous than the first two named. Fonte Intermittente, similar to D. Isabel, but more alkaline, and with less iron. Exportation, 1906, 20,917 boxes, of 48 bottles. Aguas de S. Lourenço, altitude 2,800 feet, average temperature 12° to 16° centigrade. Gravel soil. There are two hotels. The springs are seven in number, very suitable for stomach complaints and dyspepsia. The exportation is not so great as that from Caxambú.

Lambary, $3\frac{1}{2}$ leagues from Campanha. There are three springs. The most important one is gaseous, of carbonic acid type. Its temperature is 23° centigrade. There are 43 men employed at the place, which possesses an hydropathic establishment. Cambuquira, waters similar to those at Caxambú. The exportation from these two districts, in 1905, was 5,926 boxes, containing 48 bottles in each.

Aguas de Fervedouro (Carangola), nearly 2,000 feet above sea level. There are four fountains, furnishing

more than 600,000 litres in 24 hours. The water is reputed valuable in cases of paralysis, rheumatism, anæmia, scrofula, and other cutaneous and deeper seated diseases.

The most important bathing station is Poços de Caldas. These latter have been known since 1786, so they are in all probability the oldest frequented thermal springs in Brazil. There are two hydropathic establishments with four springs. Two are tapped with 42° cent., and one has a temperature of 45° cent., and the other 36° cent. The discharge of the four springs amounts to 416,372 litres daily. They are distinctly sulphurous. The concern is a large one, the loan raised to form the establishment amounting to no less than about £100,000. There is an hotel with 400 rooms, a casino, park, and athletic grounds. The whole is under the control of the State Government. The climate is splendid, as the place is situated at nearly 4,000 feet above sea level, on dry ground. In 1905, 28,502 baths were taken.

Poçinhos do Rio Verde (Caldas). Water suitable for diseases of the liver, kidneys, etc.

Aguas Santas (near Mattosinhos) 2,700 feet altitude. Cold waters, arsenical and sulphurous.

Aguas sulfurosas alcalinas do Araxá. (The title describes fully the type of these warm springs, 26° to 27° centigrade). The waters are so strongly impregnated with alkaline properties that the rough loose skin of the hands peels off immediately on contact with the spring. The smell denotes their vicinity if out of sight. Araxá is delightfully situated, 2,800 feet above sea level, and the climate is perfection itself. Pulmonary diseases are absolutely unknown to the natives of the district. The colour of the water is violet, turning to green. The springs are seven in number, and yield 3,600 litres of

water daily. Dyspepsias and ordinary derangements of the digestive system disappear, as if by magic, after a few days use of these waters, which are equally suitable for bathing in and drinking. They are situated some little distance from the town. Medical researches lead to the opinion that these springs are superior to the most famous European ones, such as Carlsbad, Baden, Aix la Chapelle, etc.

THE VOYAGE TO BRAZIL, FROM LIVERPOOL TO MANAOS.

Here we have no choice of routes. The Booth line is our only recourse, and the steamer proceeds *via* Havre, 510 miles, 2 days; Leixões (Oporto), 820 miles, 6 days; Lisbon, 1,000 miles, 10 days; Madeira, 1,520 miles, 12 days; Pará, 4,270 miles, 21 days out. Belém do Pará is 86 miles from the sea, and nearly all the city is built a few feet only above high tide level. Vessels drawing 30 feet will soon be able to come alongside the quays, and the steamer traffic is already very great. In 1907 no fewer than 4,866 vessels entered the port, carrying over 2,000,000 tons. The population of the city (1909) is over 200,000. It boasts of a magnificent theatre "Da Paz," a unique system of parks and squares, a fine museum, and a first-rate rapid transit service. From here to Manáos is, by most direct route, 850 miles, and the steamer is due there a week later than at Pará. Manáos is essentially an American city. A quarter of a century since it was but a town of no great pretensions; to-day it is a more cosmopolitan city than Pará, with a population approaching 100,000. The principal street is Avenida Eduardo Ribeiro. Its theatre rivals that of Pará, and other edifices abound that would do credit to a first-rate

European city. Everything is on the most lavish scale, the illumination alone of the city costing the municipality the sum of £40,000 yearly.

THE VOYAGE OUT TO RIO DE JANEIRO PER R.M.S.

Embarking in Southampton at 12 noon on Fridays, Hurst Castle is soon passed, and skirting The Needles the ship's head is turned towards Cherbourg, which is reached about 7.30 p.m. and left an hour or two later. During the night the Channel Islands are passed, and Ouessant (or Ushant) light early in the morning, after which there is 24 hours' run across the bay, and in the afternoon of the same day (Sunday) Vigo is within sight, Lisbon is called at on the Monday, and Madeira on the Wednesday, after which St. Vincent (for coal) in the Cape Verde Isles on the Saturday, thence a clear $4\frac{1}{2}$ days' journey to the island of Fernando do Noronha (the first Brazilian land) and about half a day more to Pernambuco—the time from England to Brazil thus being about 13 days, and the distance 4,158 miles. At present there is no convenience as yet for mail boats here, so the anchor must be dropped, and the outgoing and incoming passengers hoisted up and down in a big basket chair, when the weather does not permit the approach of tenders. As there is generally a pretty good swell on, this operation is more amusing to the beholder than to the person having to undergo it.

The usual tribe of bumboatmen come alongside with pineapples, oranges, parrots, monkeys, and curios and do a roaring trade, until the warning siren drives them overboard in a great hurry. Generally the skipper is anxious to get away, as there are 400 miles to be run

before Bahia is made, and this means 30 hours' steaming, and if any delay occurs, being behind time at Rio. Bahia is composed an upper and lower city, the latter being the centre of commercial life, and the former the residential quarter. One gains access to this by means of elevators. This old city is representative of colonial life. Here the mulatress can be seen at her best, and here, in an atmosphere of old time faith and somnolence, we see revealed Brazil as she was. To-morrow this will be changed. The tinkling of church bells is already drowned by the more strident note of the electric car, and with the completion of the new port works, the development of the railway system, and the consequent increased volume of trade, Bahia will be a great city. At present she is the centre of the tobacco and sugar and cacão trade, and her cotton industries are also not unimportant as well as the exportation of diamonds and other precious stones.

From Bahia to Rio de Janeiro Port is 742 miles, and wind and tide being favourable, Cabo Frio, the first light, should be abreast by tea time on Sunday, otherwise, and in case of delay at Bahia, speed is reduced, and it is 5 or 6 on Monday morning when the great cone of the sugar loaf, "Pao de Assucar," looms up 1,383 feet on our port bow, and we wait the officer of health and the customs, before proceeding to our berth. Now that the Royal Mail boats possess wireless telegraphy, we are signalled hundreds of miles away, and should find all the needs of the ship ready to be supplied. Elsewhere I have mentioned the marvels of Rio, and some attention should be given to the old city. Landing by tender at the Cães dos Mineiros, we go straight ahead into Rua Primeiro do Março, the widest street of the ancient city. Here is the Post Office, Bolsa (Stock Exchange), Supreme Tribunal, and the Cathedral, with the Telegraph Office at

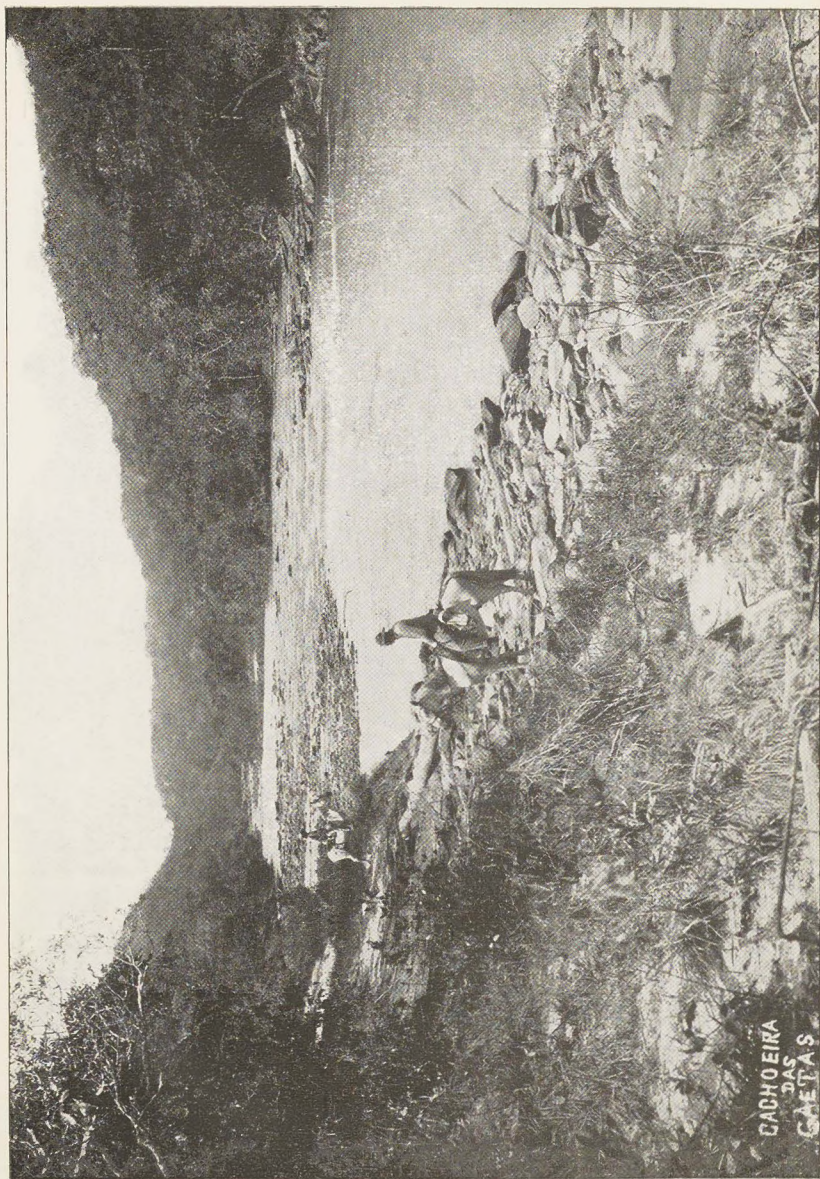


BLACK DIAMOND (BOART).

The largest piece ever found (Bahia, 1895) Weight 3,078 carats, $1\frac{3}{4}$ lbs.
Worth to-day, £54,000. A special machine had to be made to break this
up into pieces suitable for diamond drills.

Reproduced by the courtesy of Jaques Baszanger, Esq., New York.

CACHOEIRA DAS CAETAS, DIAMOND DISTRICT OF MINAS GERAES.



CACHOEIRA
DAS
CAETAS

the corner of Praça 15 de Novembro, and the Camara dos Deputados (House of Commons) hard by.

The Market is close to the water front, and the Custom House adjoining. Cross the Rua Direita (Primeiro do Março) and enter Auditor Street (Ouvidor). This is at once one of the narrowest and busiest of thoroughfares, in fact a sort of Bond Street and Fleet Street combined. In it we shall find newspaper offices (at least those that have not migrated to the Avenida Central). It is a little way up Candelaria Street, a turning on the right that we encounter the most ornately decorated church in Brazil, from which the street has its name.

Retracing our steps, and pursuing our way to the end of Ouvidor, we find the polytechnic school and the school of fine arts, the latter a little to the right, and further on the great Praça da Republica, with the mint in the centre of its opposite side, and the central station on the corner. From the park we proceed by way of Avenida Mem de Sá to the Passeio Publico (public garden), and find ourselves at the end of Avenida Central, which is over a mile long and 108 feet wide. Wending our way along this splendid road, costing $2\frac{3}{4}$ millions sterling, we pass the Cardinal Archbishop's palace, seminary, and national library (right), municipal theatre, naval club and technical college (left), and the offices of *O Paiz*, *O Jornal do Commercio*, and *Jornal do Brasil*, as well as many other palatial buildings. Just before we get to the Prainha end there is the building of the Brazilian Lloyd. From Prainha we can return if we will *via* Primeiro de Março to our starting place, the Miner's Quay. The above journey will take up two or three hours at least, and it had better be begun in the afternoon, as at three or four o'clock we shall find Ouvidor filled with its most typical throng of shoppers, idlers and tourists, and outside and in Garnier's

library, the inevitable literatii, as this bookshop is a recognised rendezvous for the members of the Academy. About six we may dine fairly well at the Café Globo in Primeiro de Março, or in one of the newer ones in the Avenida Central. So much for the most noteworthy points of interest in the city itself.

To the healthy, Brazil offers as many (or more) inducements as to the ailing. No need for the idle tourist to spend a single night away from his hotel in Rio de Janeiro. Supposing he is domiciled at the Hotel dos Estrangeiros, or that of Miss Linz, in Larangeiras (The Alexandra). From either, he can go by car, changing once or twice, to the Tijuca Mountain, and proceed in a comfortable carriage, or on a sturdy mule or horse, to the very peak, over 3,300 feet above the city. Here, hardly an hour from the very centre of Rio, he is in the midst of nature's mysteries. There is the Vista Chinezã, and the furnas (ovens), a great pile of eroded boulders. There is the distant flat topped Gavea Mountains. Across yon blue bay, with its hundred wooded islands, chief of which are Governador, and lovely Paquetá, a green fringe comes out to meet the water, and behind, the sombre cloud capped ranges of the Estrella (left), and the Organs (right), north and north-east. Behind the Estrella is the lovely Tinguá, a mysterious solitary peak, evidently of different origin to its fellows, judging by its suspiciously volcanic like cone. Nearer the open sea, and somewhat below, the Corcovado (hunchback) rears a mighty tower of rock, 2,200 feet high. This mountain may be ascended by rack rail, to almost the last step, and is crowned by a bandstand, looking curiously like a gigantic cap or umbrella. From the Alexandra Hotel we can gain the shelter of this covering in about three quarters of an hour at most. Cars pass our door, or we may walk a stone's

throw to the railway station, presided over by an Englishman (or Anglo-Brazilian), who is stationmaster, etc., all in one. If we want sea-bathing, the Jardim Botanica electric cars again are at our service, running us out to Ipanema in 30 minutes, or to Lême in less time. We shall find clean smooth sands, or if we prefer a rocky basin, a few minutes' climb from the latter, and 20 minutes' walk from the former, will bring us all the seclusion desirable.

The botanist and entomologist, or the geologist can revel in a feast of riches anywhere outside the city. Across to Nictheroy (the state capital), and a little beyond S. Domingos or Icarahy, we are in the wilds.

The best time to reach Brazil is in the winter, from June to September. Let us take our baggage and turn our attention towards the Queen of the Serras (Petropolis). Supposing we arrive by steamer at Rio in the early morning, and we are prudent enough not to be burdened with heavy luggage, we may get our goods and chattels cleared, and have done with customs' formalities before noon, if we elect to have late breakfast on board. I must go with you to be your guide, counsellor, and friend, for, of course, you are ignorant of the romantic and expressive language of Camões. Call a carregador (porter) and trundle our traps at about 3.30 p.m. to Prainha, where we take the boat. The construction of the electric railway is only just started, so we cannot travel by that. We find ourselves on board the "Leopoldina" or "Petropolis," and encounter every creature comfort, including the evening newspapers (at double the shore price, by the way). Sharp to the minute, at 4 o'clock, we cast off, and once clear of the wharf, have time to notice the faces around us. Taken all in all, a hundred or two of distinctly superior people. Prosperous merchants, stockbrokers,

officials, contractors, and engineers, with a sprinkling of the fair sex. Quite fresh enough indeed, on the water, and an overcoat is not an encumbrance. Hark! A bell rings. Look ahead. The green fringe we saw in imagination from the steep slopes of Tijuca, is close to us in reality, and we speedily bring up alongside a jetty where a train is waiting. Take care of those white tickets with letters of the alphabet largely delineated on them. They represent, if you please, a reserved seat in a special car. A, B, C, D, etc., number so and so. There is hardly time given for everyone to take their seats when we start off, gathering speed in the declining light, and by the time 5.35 p.m. is reached, we are at Raiz da Serra (foot of the range), and another engine takes us in hand, this time pushing up behind. If there happens to be a fair muster of passengers, the train goes up in sections of two or three cars each, and travellers in the hindmost one can see the others winding in and out, and finally taking the great curve which brings them out at the crest of the mountains. Some half-way up (Meio da Serra) there is a little ramshackle station, a standing disgrace to the English Company owning the line. Here there is a large cotton mill, and quite a small village has sprung up around it. We are now at about 400 metres above our starting point (1,250 feet), and on our left a sheer wall of rock goes up more than 3,100 feet. Through the right hand window the Cabeça do Frade (Friar's head), a camel's hump, like a boss, seems really close to the top of the gorge. It is a point presumed to have been triangulated, and it is quite 3,800 feet higher than our present station. At the summit of the line we are 2,600 feet above the sea, and at the beginning of civilisation again evidently, for here we see electric light, rows of chalets each side of the line, and at the station a few cabs and

carriages. The engine is replaced by one of the ordinary type, and very few minutes suffice to bring us to Petropolis itself, between two and three miles further on.

In the gathering darkness we see the station full of people, and a crowd of vehicles, amongst which are two small open trams or 'busses, running without rails. The Pensão Central, our objective, is just across the road, and in this cosmopolitan caravanserai we can speak almost any European tongue and be understood. Unfortunately there is no longer an English hotel, but we can take our choice of Italian, Brazilian or German, if we prefer another and cheaper one to that over the way. To our disgust, we must dress for dinner, if we choose the latter, or find ourselves in the minority. The city has about 25,000 inhabitants, and it has developed from a summer resort to an industrial centre, as there are in its midst two silk mills, cotton and woollen mills, breweries, nail and cardboard works, an ice factory, and envelope and stocking factories. Hardly two hours from Rio, and when the electric line is finished it will be only seventy minutes' journey, and by the improved service of the Leopoldina Railway route the bay some eighty miles. The climate, however, is quite different, and we shall be glad of two or three blankets on our bed. There are many delightful excursions, one to Fazenda do Campos, two hours on horseback, where one can look down and see the great capital almost at our feet, as we can also at Alto da Serra, just beyond the railway station by which we came up. Here we may see, in the early morning, the famous *mer de nuages*, with its snowy billows far below, breaking like waves against the serried cliffs, and passing between their broken walls like spindrift. Yonder in the middle distance, there are islands rising out of this sea of clouds. Queer pointed peaks lifting

themselves above the reek. By mid-day all is gone, and only remains the dull leaden shroud, half hiding Rio in the background. Another time we can go by the Caminho dos Mineiros (the miner's road), to Caxambú, and leaving the dark depths of the reservoir away on our left, ascend by a mountain road to the summit of the pass (5,300 feet), and look down on the northern side of the bay, and at Magé, and Piedade beyond, where starts the tiny line that creeps up the Serra to Theresopolis, the coming rival to Petropolis. Look across yon awe inspiring valley, there looms in front a tremendous mountain mass, with an assemblage of huge boulders at its highest point. From where we stand it is inaccessible, but we shall succeed in reaching it another day. There is also the Fazenda Ingleza, a famous picnic place, the Crémérie Buisson, the Presidencia, the Cortiço, the top of that towering wall of rock, seen at Meio da Serra, and then there is Cascatinha (the little cascade), and Correias further along the line towards the interior. In short, there are enough excursions for a month, but whatever is missed, Itaiassú (or Pedra Assú, as it is called wrongly with its bi-lingual name, half Portuguese, half Guarani), must be visited. We must leave our hotel well provided with blankets and creature comforts at 4 p.m., and take horse, or tramp to Pereira's, the last house, the veritable Ultima Thule. Here under the hospitable roof of this rosy, cheery old chap, we may sleep after our two to two-and-a-half hours' journey, as the morn must see us under way as soon as daylight permits, at 6 to 6.30 anyhow. At Pereira's we are about 1,100 metres above the sea, or 300 higher than the station at Petropolis. From this, if we are wise, we shall not attempt more than 100 metres rise per half-hour, including halts, and so we shall come out at Isabeloca in about four hours, and here we can

rest, as we are suddenly free of the eternal forests, and find ourselves on a small wind-swept ridge, or rim, with a drop away to nothing before us, and a swamp to the left, and beyond it, the last and highest green slopes. Look down, where we stand, and see a tiny white cluster of houses representing Petropolis, and nearer still the winding road leading from the city to the sombre way by which we have ascended.

Everything is different here. That great sheet of water with its countless isles that frames Rio de Janeiro, is diminished, as if we had been looking through the wrong end of the telescope. The ocean looms large before us. We stand where man is made to feel his littleness. Sea, sky, and mountains combine here to exert a dominating influence over the human soul. Consider now the herbage at our feet. We left in the town a hundred forms of familiar flowers, roses, dahlias, magnolias, camellias, heliotrope, jasmine, cannas, hortensias, and the flaming branches of the bougainvillea. Ere we reached Pereira's, the last climbing fuchsias had been left behind, and the orchids, those mimics of the butterflies, have long since gone, or at any rate nearly all of them. In the dark depths of the forest we had hardly noticed the change, but now the ground is covered with a profusion of flowers we fail to find in the sub-tropical zone below. There are bulbs scattered here and there, hardly attached to the soil, and besides the amaryllides, many sorts of plants of an alpine character, and which, alas, would not live even if we were successful in transplanting their seed or roots to Petropolis. Breakfast despatched, we step out manfully, in Indian file, along a tiny path that has been worn by the tapirs on their way to the pool. Shortly we seem to be lost in a labyrinth of sword-grass tufts, reaching six and seven feet in height, and so toiling for

an hour, we cross the little stream trickling through the farther side of the swamp (a lake in February), and climb up the other side to the shelter of those boulders that form the Castello, or the Itaiassú (great stone) itself. Here we are 2,250 metres above Rio, or approximately 7,400 feet, and the height of the boulders may be 35 to 40 feet more. One I measured, is 33 feet.

The altitude given, is that taken by two compensated aneroid barometers, afterwards corrected by observations taken simultaneously in Petropolis. If possible to climb up one of the higher boulders the labour entailed will be well repaid, but one needs nerves and muscles of steel for such a task. I think few persons have succeeded in getting up by aid of the sparse vegetation growing in the clefts of the rocks. I once managed this feat at considerable risk, and some damage to my clothes, but certainly I was in far better training than at present.

Probably there is no view so comprehensive in all Brazil, and certainly there cannot be any so glorious. Far as the eye can reach in the west, north, and south, rise serried masses of mountains fading away towards the setting sun in the distant valley of the Parahyba. The ranges take the most fantastic forms, seemingly due not to nature, but to the cyclopean architecture of some bygone race of demi-gods. Towers, spires, domes, minarets are scattered here and there in picturesque confusion. In the north there are isolated masses and peaks marking the site of Novo Friburgo, and the vicinity of Cantagallo, where the gold mines formerly existed. We cannot catch a glimpse of Itatiaia, for this monarch of all Brazilian mountains, hides himself in the south-west, behind a tremendous *massif*. Here we must sleep, and the first thing to do is to collect fuel, a very scanty thing indeed, and perhaps we shall find nothing but



the feathery tops of the taquaril, a small cane, hardly as long as a walking stick. Then a pile of these same tops must go towards making our bed, and a wind screen of some sort thrown up, for the great boulders form a sort of funnel here. If we have completed our preparations to brave the elements, we may perhaps make a tour of our fortress, finding that it takes at least half an hour. Night comes on apace, and we boil our billy, and sit under the dark rock watching the moon rise, surely twice the size of the northern sphere, and as bright again. Now with the disappearance of the sun, rude boreas comes sweeping, and whistling through the crevices all around, blowing the ashes of our dying fire in every direction. Cover up well, and creep in close together as we may, one or other must need jump up now and then to replenish the blaze. Towards morning there is a thin film of ice over the pool which lies amidst the rocks. It is not, however, the temperature marked by the mercury that chills us. It is that bitter, piercing blast that comes sweeping across this exposed site, all the way from the Antarctic regions.

Sunrise sees a pair of shivering pilgrims, struggling to get up their circulation, and to stimulate the flagging energies of the fire. 9 a.m. soon arrives, and the homeward march must be begun. We go down naturally much quicker than we came up, and arrive at Pereira's by 2 p.m., where we lunch and rest, and take horse back to Petropolis. Unfortunately, although the Piabanha River winds through the town, and the Itamarity joins it ere it reaches Cascatinha, there is no fishing. The dyes from the factories have poisoned all the large fish that have not been destroyed by dynamite cartridges; so if we want any angling it will be necessary to travel some three or four leagues at least. There are, however,

many rivers which contain abundance of finny life, and some, as the dourado and pirarucú, afford good sport. The seas swarm with a hundred different types of scaly monsters, and some amusement may be had, with rod and line, from the rocks near the Gavea (Rio de Janeiro).

We can take the train, when tired of Petropolis, to Itaipava, and from there amble gently into Theresopolis the same afternoon. Here there is less distraction. Only one hotel worth stopping at ("Hygiene,") and hardly anything to do but amuse ourselves by excursions amongst the mountains and woods. From here we join the iron road again, and afterwards the boat to Rio de Janeiro. If limited in time, we can come out to Rio by the Royal Mail steamer, leave her on the Monday morning, or Sunday night, go straight up to Petropolis, visit Itaiassú, etc., and leave for Theresopolis the following Monday, and remain there until Friday, arriving at Rio on that day. We have then $4\frac{1}{2}$ days left to make the acquaintance of the capital, as the steamer leaves on the following Wednesday afternoon. Otherwise inclined, a journey to Ouro Preto and Morro Velho to see the gold mines, Bello Horizonte, and thence to São Paulo, and, if time permits, from Paranaguá to Curytyba and back, may fill up our time. To do justice to Brazil a month should be spent in Rio alone, adding at least from May to the beginning of October in the provinces, not forgetting the Iguassú falls (Paraná).

No one need fear the want of the common necessities of civilised life. As long as no attempt is made to travel away from the iron road, most European luxuries can be obtained. The American habit of living in hotels has caught on in Brazil, and in such places as Petropolis, Friburgo, Theresopolis, Poças de Caldas, etc., many families remain *en pension* for months together, to save the bother of a house and its attendant worries. Reference to the table of cost of living will convince the sceptic, that prices

are not out of proportion to those of Europe. I have in my mind a type of 10s.-a-day hotel, very common in the provinces in England, that certainly treats its guests far worse than one of the same class in Brazil. The Brazilian who has travelled in Europe is generally more exacting in the way of diet than the average British tourist, and he is not so disposed to phlegmatically put up with it as the latter; and, as he expressively puts it, frequently *passando uma descompostura no hoteleiro*; that is, giving him a good dressing down, in language more forcible than polite. The verb *to descompôr* is in common use in every-day life, indeed, and Anglo-Brazilians are adepts in its employment.

PAULO AFFONSO FALLS.

A capital article has appeared in the January number of the Bulletin of the Bureau of American Republics. This is illustrated by some very good photographs of the falls. To get to them, it is necessary to take steamer from Pernambuco or Bahia to Penedo. From Penedo to Piranhas, the nearest port to the falls, one may proceed by small steamer or sailing boat (canoa) taking two days to cover the 150 miles. From Piranhas a railway runs to Pedras, from whence two or three hours riding bring the traveller to the edge of the tremendous cañon through which the river runs. Five branches of the river unite near here, four of them descending in a series of cascades and rapids to form the great *Mai do Cachoeiro*—(Mother of the Falls) in its final leap. The best view from a spectacular point, is obtained from the cliff 300 feet above water level, and owing to the exuberance of tropical growth, it is necessary to make a clearing before the falls can be seen. Below, the whole mass of water roars angrily through a narrow passage, between blackened rocks. Above, a thousand miles of unobstructed navigation leads into the heart of Brazil, until at Piráporá the Central Railway is struck, and one may take train direct to Rio de

Janeiro itself. The São Francisco river is certainly fated to play a great part in the development of the hinterland of Bahia, Minas Geraes, and Goyaz.

TIMETABLE AND FARES TO SOME RESORTS.

From Rio to Petropolis. Fare 6\$400.

From Praia Formosa, 8-43 a.m.,	...	arrive 10-35 a.m.
5-20 p.m.	...	„ 7-12 p.m.
6-51 p.m.	...	„ 8-41 p.m.
From Prainha ... 6-45 a.m.	...	„ 9-37 a.m.
4 p.m.	...	„ 6-20 p.m.

Itaipava (for Theresopolis, via Petropolis). Fare 8\$400.

Novo Friburgo (via Prainha-Nictheroy). Fare 12\$300.

Depart 6-10 a.m. ... arrive 10-55 a.m.

„ 3-15 p.m. ... „ 7-22 p.m.

São Paulo, via Rio, (Central Railway).

Express return fare 54\$500, excursion 52\$000.

Depart 5 a.m. ... arrive 8-25 p.m.

„ 8 p.m. ... „ 7-50 a.m.

Leave São Paulo for Rio, 5-15 a.m., and 8 p.m.

Bello Horizonte, via Rio Central Railway).

Fare 60\$500, excursion 58\$000.

Depart 6-15 a.m. ... arrive 10-35 p.m.

Leave for Rio, 4-20 a.m., arrive 7 p.m.

Ouro Preto, via Rio.

Return express fare 57\$000, excursion 54\$500.

Depart 6-15 a.m. ... arrive 8-30 p.m.

Leave for Rio, 4-45 a.m., arrive 9-45 p.m.

Also depart Burnier (junction) 9-10 a.m., arrive Rio 8-40 p.m.

Excursion Tickets issued by the Central Railway to Entre Rios, Juiz de Fôra, Barbacena, Sabará, etc., etc., etc., valid for 40 days, reduction of 20% in baggage charges, and abatement for one person 5%; (2) 10%; (3) 15%; (4) 20%; and 5 or more persons 25% off ordinary return fares.

CHAPTER XX.

Literature and Art.

RUY BARBOSA must be given pride of place as a thinker and idealistic writer, and the author of literary works of uniform excellence. He has been a journalist, working on several Rio papers. His literary life began in 1874, with a monograph entitled, "Crime against industrial property," and a long series of important treatises, written at home and in exile. (Letters from England, 1896.)

Amaro Cavalcanti. Was a professor of languages at 20 years of age. Is a famous political economist.

José Maria Da Silva Paranhos (Barão do Rio Branco), Foreign Minister. Of this master mind we have already written, in men of affairs, otherwise he would have undoubtedly headed this page. He is an Admirable Crichton, and that is all that need be said of him here.

Joaquim Nabuco (1849-1919). The polished classical scholar and brilliant orator. Another of the old school, graduating, like the Barão do Rio Branco, under the Empire, formerly Minister to England, and now Ambassador at Washington. Nabuco was not a very popular man, he was at times haughty and uncompromising, and such qualities did not commend themselves to the young Republicans. His books are full of that spirit of romantic melancholy which seems engendered by the atmosphere and vast brooding silences of Brazil; this minor key, that is sounded by the soft summer winds in the palm groves of the north, and the pine

woods of the south. Nabuco is well interpreted in the phrase—"Defiance and contempt of the littleness and meanness of man." He wrote, "The judgment of the Masses," which elevates us to-day and lowers us to-morrow, represents only the dust of the roads, "and tyranny had been revived in Brazil at the point of the same bayonets that had put it down."

Machado de Assis (1839-1908). Graduated from the printing form, and attained the first prize in the Academy, by sheer force of merit. He was called the prince of Brazilian literature. First a psychologist, the master of comedy. Verses (1869) being succeeded by an *olla podrida* of material. His best known work is "Braz Cubas," a novel. His epitaph is best expressed by saying—He was a child of his own work, he owed what he was to his constant labour.

Mello Moraes (a Bahiano). One of the sweetest lyrical poets, is, like most Brazilian writers of repute, many sided. The historian of the gypsies, the student of folk-lore, and the voice that cries out as a soul in the wilderness.

Assiz Brazil. Diplomat, agriculturalist, and economist. He has written on law, politics, and poetry, and excels in all he attempts. He is a Mineiro, and one of the most brilliant sons of that state.

Graça Aranha (Dr.) Maranhão has the honour of being the birthplace of this gifted writer. He is a jurist, and has been charged with many most important international questions, but above all, he is a romancist and idealist. So far, the most important work from his pen is "Canaan," a sad yet fascinating story, breathing forth the subtle essence of the national character; a romance, yet a broken melody, a fugue without an end. This great book is translated into Spanish, German, and French. I say great, because it succeeds in enthralling

the reader, of holding his attention captive, and thus fulfilling the mission of a true work of genius. This romance was written in London in 1902, whilst the author was first secretary of the special mission to England.

Medeiros e Albuquerque. He is the Didot of the Brazilian Academy; an encyclopedia in himself. Journalist, poet, and tale-teller. He was born in Recife, and it is no discredit to the south to say that the north is the cradle of Brazilian literature.

Afonso Celso—"The Catholic." A count of the Holy Roman Empire; meriting a title, if only by his literary work. He has translated, in verse, the masterpiece of Thomas a Kempis. A member of the Historical Institute and the Academy.

Coelho Netto (Maranhense, like Dr. Graça Aranha). Suffice it to say that any one of his books would have made an author's reputation. Comedies, tragedies, librettos, criticisms, historical chronicles have poured forth from his pen since 1883, when his first work saw the light.

João Ribeiro. Is best known as a grammarian, having been responsible for several philological works. He has been editor of various newspapers in São Paulo and Rio de Janeiro.

Rocha Pombo. The leading historian of the younger generation. A journalist and novelist.

José Carlos Rodrigues. The Gordon-Bennet of South America. A self-made man. He is managing editor of *O Jornal do Commercio*, undoubtedly the greatest newspaper printed in the Portuguese language. Added to literary and linguistic ability, he possesses great business capacity, and has rendered the Republic enormous services. The *Journal of Commerce* is the doyen of the South American press. During the presence of the

American fleet in January, and the British squadron in December, 1908, a large section of the paper was printed in English for the benefit of the visitors.

Alcindo Guanabara. Chief editor of *O Paiz*, a journal of marked intellectual force.

No list of literary giants would be complete without the name of Capistrano de Abreu. The greatest eulogy possible, is to say that this historian would have been famous in any land, and at any epoch. He is a native of the State of Ceará, born 1853, and his works include most exhaustive and minute studies of the colonial times, as well as translations from English, French, etc.

José Verissimo. Pará, 1857. The leading critic, justly feared and admired. An anthropologist, college professor and educational writer.

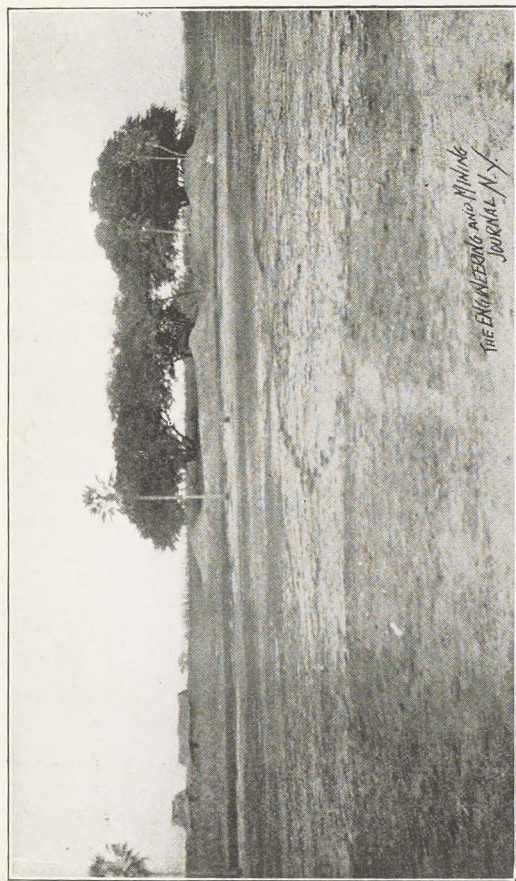
Amongst other romance writers, we may mention Nestor Victor, Aluizo Azevedo, Xavier Marques, Pires de Almeida, Inglez de Souza, *ad infinitum*. We must not, however, forget Madame Julia Lopes de Almeida, perhaps the leading woman writer in Brazil. She has published "O livro das Noivas" (the brides book), "A Fallencia," and "A familia Medeiros," amongst other works.

The greatest playwright is Arthur Azevedo (Maranhão). Has written more than 40 plays, operas, and sketches, besides short stories.

Poets are well represented by Olavo Bilac, and Magalhaes de Azeredo, Augusto de Lima, Fontoura Xavier, Lucio de Mendonça, Luiz Edmundo, Luiz Guimares (has had his verses translated into Spanish, French, and Swedish), Raymundo Corrêa and Mucio Teixeira are other noteworthy poets.

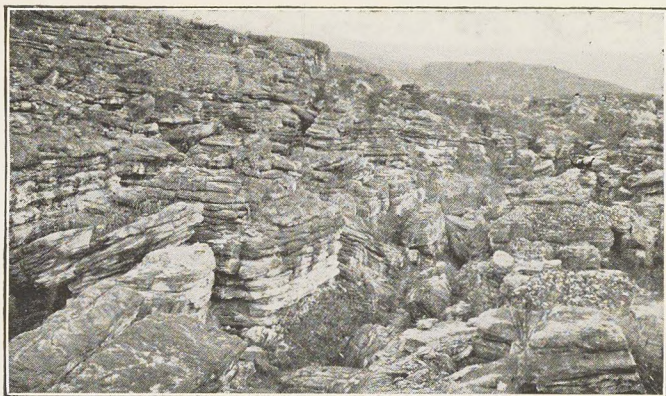
MUSICIANS.

Alberto Nepomuceno (Ceará). His *magnum opus* is

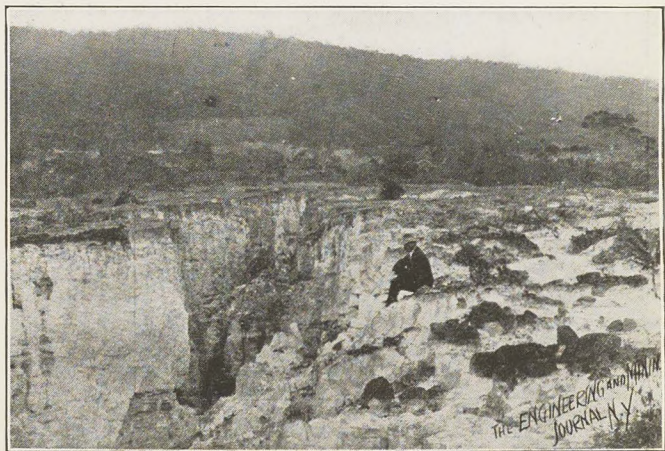


SALT FACTORY AT TABUA,
Upper Salitre River, Bahia.

By the courtesy of *The Engineering and Mining Journal*, New York.



RIDGE OF DIAMOND BEARING PINK QUARTZITE
(False bedded with faults) North of Andarahy, Lençoes District,
Bahia.



OLD WASHINGS AT MOSQUITOS, LENÇÕES,
Showing white shales underlying diamond bearing formations.

"Artemis," an opera. Henrique Oswaldo, winner of the great international contest, organised by *Le Figaro*. His piece, "Il neige," taking the palm from 600 competitors. Meneleu Campos, Francisco Braga, and Dr. Abdon Milanez (a very popular composer), and Carlos de Mesquita head the list of musicians.

The Brazilian sculptor, *par excellence*, is Rodolpho Bernadelli. He has peopled the gardens and groves of his native land with beautiful marble forms. Corrêa Lima is a young and gifted pupil of Bernadelli, a fine group (Mater Dolorosa) coming from his hand.

The principal painters are, Aurelio de Figueiredo (Paulo e Francesca), Rodolpho Amoedo (a *Narração de Philetas*), Antonio de Parreiras (a *Derrubada*), Rodolpho Chambelland (a *Sahida do Baile*, leaving the ball), Elyseu Visconte. J. Baptista, and Henrique Bernadelli (*Tarantella*, *Casas Brancas*, *Meditando*, *Syria*).

Glancing at an "Anthologia Brasileira," of prose and verse, I find extracts from 155 writers, and it is safe to say that this number hardly represents the leading literary Brazilians. For a country, whose literary life hardly amounts to a couple of hundred years, the record, both of amount of work and quality of output, is a magnificent one. A most impressive feature of the history of literature in Brazil, is the fact that so many authors have suffered (even to death) for their principles, and that in nearly every case the work has been considered before the workman. Power and preference has been sacrificed to the ideal, and the result is glorious traditions, and bright promise for the future.

CONCLUSION.

"Ordem e Progresso," the Brazilian motto, typifies the policy of the nation to-day. Her conquests have been won by arbitration, in place of war. She has settled almost all her frontier questions, and is able to turn her attention to internal development, and this is proceeding at a pace almost inconceivable. The iron horse is stalking over the land. There is not a state that does not feel the breath of life stirring its pulses, awakening it from slumber, and impelling it forward. *Avante!* (forward) is the word everywhere. Where Burton, St. Hilaire, and other voyageurs disturbed the silence of the virgin forests, the screech of the locomotive is heard. The advance guards of civilisation are even now passing the frontiers of Goyaz and Matto Grosso, and soon the railroad will reach the most distant and isolated parts of the Republic. Rio has arisen like a Phoenix from the ruins created, not by disaster, but by the house breaker. To quote Admiral Sir Percy Scott, in his farewell message to the Brazilians.—In the near future Rio de Janeiro will be the most beautiful city in the world.—Space will not permit me to tell of its marvels. It is not "see Naples and die," but see Rio, and wish never to leave it. And the capital is only a gem in the most exquisite setting, surrounded by clusters of others, if less radiant and glorious; still entirely worthy of their Queen. The best ending I can give this little book is to say *Estou com Saudades do Brazil*—Saudades, this word expresses every sense of longing and sweet remembrance. I dedicate my work, not to Brazilians, but to Brazil, to that mighty spirit of forest, fell and fountain that still holds me in her spell.

J. C. OAKENFULL.

Devonport, England, March, 1910.

APPENDIX A.

SALARIES AND COST OF LIVING IN RIO DE JANEIRO, ETC.

SALARIES (RIO DE JANEIRO).

Tram conductor,	6 to 8 milreis,	daily.
Carpenter, etc.,	6 to 8	„ „
Painter	6 to 15	„ „
Baker	5	„ „ with bread.
Clerk, ordinary,	100 to 200 milreis,	monthly.
Book-keeper, or cashier,	200 to 600 milreis,	monthly.
Shop assistant,	80 to 400 milreis,	monthly, with board but not lodgings.
Gardener,	100 to 150 milreis,	monthly, without board.
	With board and lodging,	80 to 100, monthly.
Police,	4 milreis,	daily, board and lodgings.
„	married (living out of quarters),	5 to 6, daily.
Civil guard,	150 to 250 milreis,	monthly.
Seaman (coast), all comprised,	80 to 100,	monthly.
Ship's steward,	40 to 50,	monthly.
Male servant,	40 to 150,	monthly.
	Cook, female,	30 to 100.
General „	10 to 60,	„ Nurse, 10 to 120 milreis.
Wet nurse,	80 to 150,	monthly.
Postman,	100 to 300,	„

Salaries are more in the States of Para and Amazonas, and less in the south, except as far as mechanics are concerned. Expert machinists, engineers, etc., are highly paid, but the demand is very little.

COST OF CLOTHING.

Suit of clothes to measure 40 to 160 milreis.

" " ready made 30 " 60 "

Boots ... " 8 " 25 "

" ... to measure 15 " 40 "

Socks ... pair 1 " 5 "

Collars per dozen, 8 milreis.

Cuffs " 15 "

Ties, each 500 reis to 4 milreis.

Under shirts, each 2 to 8 milreis.

White " " 4 " 10 "

Pants " 3 " 5 "

Hats, straw " 4 " 12 "

" soft felt " 8 " 15 "

" hard felt " 8 " 15 "

" English " 15 " 25 "

Fancy vests " 6 " 10 "

Handkerchiefs, 500 reis to 1 milreis.

RENT.

Workmen's cottages, 25 to 60 milreis monthly.

Houses 60 " 200 "

Large ditto 200 " 500 "

Gas, two burners 5 " 10 "

Taxes, 3 milreis monthly for house rented 180 milreis.

Furnished house or flat, Rio de Janeiro, 100 milreis upwards.

" " Petropolis " "

COST OF LIVING.

Hotels, 3rd class, 5 to 6 milreis, daily.

" 2nd " 6 to 8 " "

" 1st " 10 to 16 " "

Pension, with room, 100 to 250 milreis, monthly.

" without room, two meals, 45 to 90 milreis, monthly.

Wine (national), 600 reis to 800 reis, bottle. Imported,
1 milreis, upward.

Milk, per litro, 400 reis.

Butter, kilogramme, 3 to $4\frac{1}{2}$ milreis.

Cheese, per kilogramme, 1 to 2 milreis.

„ imitation Dutch, 2 to $2\frac{1}{2}$ „

Meat, kilogramme, 4 to 9 hundred reis.

Mutton, 1 to $1\frac{1}{2}$ milreis.

Pork, „ „

Rabbits, each, 1 milreis.

Hares, „ $1\frac{1}{2}$ to $2\frac{1}{2}$ milreis.

Chicken, „ 1 to 2 milreis.

Matte, 400 to 600 reis, kilogramme.

Bread, 400 reis, kilogramme.

Beer, 300 reis to 1 milreis, a bottle.

Rice, kilogramme, 300 reis.

Barley, 1 milreis, kilogramme.

Sugar, kilogramme, 400 to 600 reis.

Coffee, 800 reis, kilogramme.

Cocoa, 800 reis to 1 milreis, $\frac{1}{4}$ kilogramme.

Tea, up to 15 milreis, kilogramme.

Lipton's tea, in $\frac{1}{4}$ kilogramme tins, 3 milreis each.

Tram fares, from 100 reis to 400 reis.

Cab „ „ 1 milreis upwards.

Motor car fares, from 5 milreis upwards.

As with salaries, cost of living is less in the south, and in Minas and São Paulo, and much more in the most northern states, English, French and German preserved foods being correspondingly dear. Above applying only to native produce.

SOME WHOLESALE PRICES (RIO DE JANEIRO) DURING 1909.

Cane spirit (aguardente, or cachaça), pipe 111 to 130 milreis.

Alcohol, 40° per 480 litres 158 to 180 milreis.

Cotton, arroba, 9 to 11 milreis.	
Sugar, per kilogramme, crystals, 310 to 360 reis.	
„ „ yellow do. 260 to 280 „	
„ „ brown 180 to 270 „	
Lard (Rio Grande), per kilogramme 880 to 1880 reis.	
Onions (Rio Grande), per hundred 1\$800 to 2\$200.	
Rice, national, per sack 19\$000 to 27\$000.	
„ imported „ 23\$000 to 40\$000.	
Pemmican (carne secca), kilo 580 to 800 reis.	
Mandioca flour, 45 kilos 6\$400 to 10\$000.	
Wheat (national), sack 25\$000 to 27\$000.	
„ Argentine „ 26\$600 to 29\$000.	
Soap, per killogramme 440 reis.	
Bacon, fat, national, kilo \$900 to 1\$100.	
Tobacco (arroba), Bahia, leaf 12\$000 to 14\$000.	
„ „ Minas Geraes 17\$000 to 19\$000.	
„ „ Rio Grande do Sul 7\$000 to 8\$200.	
„ „ Goyaz 28\$000 to 30\$000.	
Herva matte, barrels, per kilo 400 to 550 reis.	
„ tins, per kilo 1\$000 to 1\$100.	
„ packets, per kilo \$900 to 1\$000.	

SALARIES (PARANÁ STATE).

Agricultural labourers, per day, 2/6	4/6.
Gardeners, ordinary, „	4/- 5/6.
„ good „	6/- 7/6.
Carpenters „	4/6 6/9.
Turners „	8/- 9/6.
Smiths, masons and sculptors, per day, 6/-	12/-.
Electricians (assemblers), per month, £25	£35.
Tailor's cutters, per month, £20	£35.
Coachbuilders, „	£16 £20.
Tailors, per day, 5/-	10/-.
Printers (lithographic), per day, 8/-	10/-.

Jewellers, per day, 6/-	10/-	
Rulers (printer's), per day, 6/-	8/-	
Lithographic (engravers), per month,	£20	£35.
Watchmakers, per day, 8/-	10/-	
Photographers (retoucher's), per day, 4/6	6/-	
Travellers (all expenses), per month,	£6	£30.
Book-keepers, per month,	£15	£25.
Hairdressers, „	£4	£6 £8.
Painters (ordinary), per day, 6/-	8/-	
Clerks and shop assistants, indoors, per month,	£6	£8.
Bakers, per month,	£6	£8.
Farm labourers, indoors, per month,	£3	£5.
Stablemen, „	£2	£3 10s.
Coachmen, „	£4	£6.
Cab drivers, „	£4	£6.
Female servants, indoors, per month,	£1	£4.
Cooks, indoors, per month,	£3	£6.
Nurse girls, indoors, per month,	£1	£4.
Chambermaids (housemaids), indoors, per month,	£3	£6.
Male cooks, indoors, per month,	£3	£6.
Cooks, assistants, indoors, per month,	£2	£4.
Butlers, indoors, per month,	£5	£7.
Governesses, private, indoors, per month,	£4	£7.
„ college, „	£8	£10.
Dressmaker, per day, 3/-	6/-	
Ironers, per day, 2/6	3/6	and board.

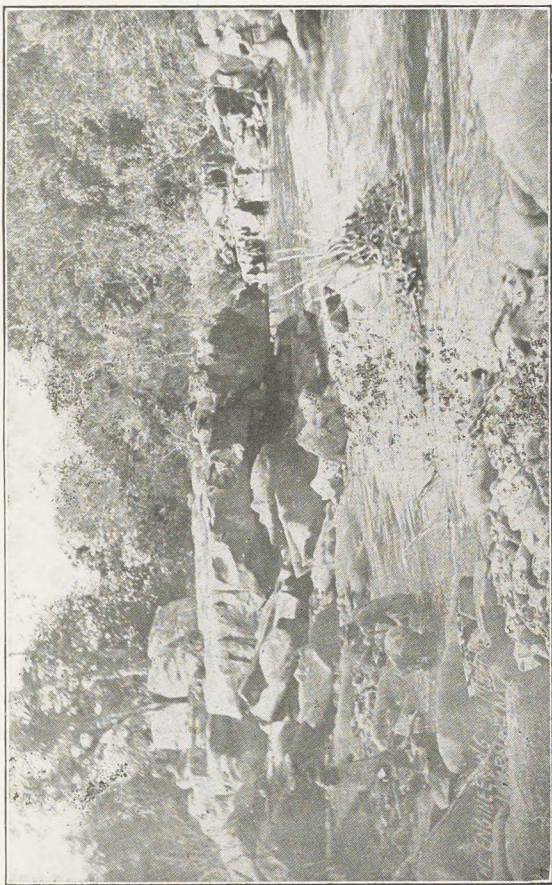
 COST OF LIVING (PARANÁ).

Milk, litre	300 reis (4½d.)
Fresh butter, kilogramme	3\$000 to 3\$600.
Cheese „	1\$200 to 2\$400.
Lard „	1\$000 to 2\$500.
Beef dripping „	500 reis to 600 reis.

Beef, kilogramme, 500 reis to 800 reis.	
Pork ,, 1\$000 to 2\$500.	
Chickens and Fowls, each 1\$000 to 2\$500.	
Ducks ,, 1\$000 to 2\$500.	
Turkeys ,, 3\$000 to 5\$000.	
Geese ,, 1\$800 to 3\$000	
Eggs, per dozen, 400 reis to 900 reis.	
White bread, kilogramme 400 reis to 600 reis.	
Rye ,, ,, 250 ,, 400 ,,	
Wine, local red, small bottle, hectolitre 500 reis to 800 reis.	
Wheat flour, kilogramme 450 reis to 600 reis.	
Maize ,, ,, 300 ,, 400 ,,	
Rice litre 400 ,, 500 ,,	
Salt ,, 400 ,, 500 ,,	
Sugar kilogramme 500 ,, 800 ,,	
Potatoes, 40 litres 2\$400 to 4\$000.	
,, sweet ,, 1\$200 to 1\$800.	
Black beans, litre 300 reis to 400 reis.	
Paraffin, 18 litres 4\$000 to 5\$000.	
Firewood, per cord (small load) 3\$600 to 4\$200.	
Charcoal, kilogramme 60 reis to 75 reis.	
Small houses for five or six persons, one storey, 20\$000 to 50\$000 per month, generally with small garden.	

COST OF LIVING (PARÁ & AMAZONAS).

Beef in Pará from 1\$000 to 1\$400 a kilo.	
,, Amazonas (Manaós) 1\$500 to 2\$500 a kilo.	
A good room in ,, 100 to 120 milries per month, unfurnished, in the Acre territory or Purús or Jurua.	
Dried meat (xarque) costs 2\$000 a kilogramme.	
Lard costs 64\$000 for 15 kilogrammes.	
Chickens,, 10\$000 to 14\$000 each.	
Sugar ,, 10\$000 a kilogramme.	
Butter ,, 10\$000 ,,	
Beer ,, 2\$000 to 3\$500 a bottle.	
Port Wine, Brandy, &c., 10\$000 to 12\$000 a bottle.	



WASHING FOR DIAMONDS IN THE ITAPICURÚ BELOW QUEIMADAS, BAHIA.

This and the following pictures of the Bahia Diamond District are by the courtesy of Professor Branar-r, and *The Engineering and Mining Journal*, New York.



THE SALITRE VALLEY,
Typical Catinga or second-growth forest.



THE VALLEY AT MOSQUITOS,
Seven kilometres south of Lençoes; diamond bearing formation
in the background.

With regard to the prices charged by the rubber merchant to the collector, we have dealt with those under their proper heading, as they do not come within the scope of this chapter. It must of course be understood, in considering the above prices, that salaries are correspondingly high. If one reckons the cost of living in Manaus as double that of Rio, it may be safely assumed that pay corresponds. These things, it goes without saying automatically balance themselves the world over.

In Amazonas turtle flesh is largely consumed. In Minas beef is sold without bone, and is relatively cheaper than anywhere, except in Rio Grande do Sul. In Petropolis butter is sold by the pound, and is always made in the district. Here most country people bake their own bread. Throughout Brazil mandioca flour, rice and beans are the staples. Except in the south general use is made of dried salted beef (*xarque*) or *carne seca*. The common drink is locally brewed beer. A vast quantity of *cachaça* or *paraty* is drunk (white rum), and it is very cheap, serving as a beverage, or as methylated spirits. Fish is dear (in Rio) owing to the want of proper vessels for the purpose, and fruit is generally not too cheap. Bananas being usually about 4 or 6 for 100 reis, and oranges 2 to 4 for the same sum. In Bahia, oranges (navel) are, however, of the finest, and in Pernambuco and vicinity pineapples are cheap, and most excellent.

APPENDIX B.

EXTRACTS FROM THE CUSTOMS TARIFF.

Description of Articles.	Rate.	Tax.
	per cent.	
Felt or beaver hats	60	6\$400
Brushes, mother of pearl or ivory backs or tor- toiseshell	50	36\$000 kilogramme
„ bone or wood for hair and clothes ... ..	.....	8\$000 dozen
„ shaving and hat ... ..	.....	6\$000 „
„ tooth and nail ... ..	.....	2\$000 „
„ metal cleaning ... ..	.....	2\$000 „
„ scrubbing ... ..	.....	9\$000 „
„ brooms and others ... ..	.....	4\$000 „
„ for tarring ... ..	.....	6\$000 „
„ painter's ... ..	.....	3\$200 kilogramme
„ artist's (fine)... ..	.....	25\$000 „
„ second ... ..	.....	12\$000 „
„ house decoration ... ..	.....	5\$000 „
Harness, one animal	60	from 40 to 240\$000 set
Boots and shoes, top	60	20\$000 pair
„ half... ..	60	15\$000
„ ordinary ... ..	.....	7\$000
„ satin shoes... ..	.....	up to 14\$000
„ ordinary chil- dren's, etc., also slippers ... ..	.....	from 700 reis to 6\$000
Pens (nibs), ordinary	50	4\$000 kilogramme
„ gilt	50	30\$000 „
Hats or caps, any other kind... ..	60	4\$700 each
Belts, any kind	60	10\$000 kilogramme
Ties, any kind... ..	60	6\$300 dozen
Gloves, kid ... ..	.....	27\$000 „
„ ordinary ... ..	.....	10\$000

EXTRACTS FROM THE CUSTOMS TARIFF—CONTINUED.

Description of Articles.	Rate.	Tax.
	per cent.	
Leggings, leather	60	5\$000 pair
Saddles ... ..	.....	30 to 50\$000 each
Oil, animal (tins)	50	\$300 kilogramme
„ machine (tins or flasks)	50	1\$200 „
Lard	50	\$300 „
Meat, ox, sheep, pig	30	\$100 „
„ game	30	\$500 „
„ dried	20	\$200 „
Wax, ordinary... ..	50	\$700 „
„ prepared	50	1\$600 „
„ candles, etc.	50	2\$400 „
„ figures, etc.	50	4\$000 „
Glue or gelatine	50	\$200 „
Condensed milk	60	\$500 „
Tongues, etc.	30 to 50	\$300 to 1\$200
Butter, pure	50	1\$500 kilogramme
„ substitutes	50	3\$500 „
Eggs ... ..	.....	free of duty
Guano ... ..	.....	„ „
Fish, etc., including shell fish	20 to 50	from \$060 to 1\$200
Cheese	50	1\$200 kilogramme
Soap, unscented	50	\$400 „
Tallow	25	\$100 „
Sponges, fine	50	20\$000 „
„ ordinary	50	5\$000 „
Pearls	2	ad valorem
Buttons, bone or horn	60	1\$000 kilogramme
„ ivory, tortoiseshell, or mother of pearl	60	12\$000 „
Combs, bone or horn	50	6\$000 „
„ ivory ... ..	.....	28\$000 „
„ tortoiseshell ... ..	.....	60\$000 „
Barley, in grain or malted	25	\$040 „

EXTRACTS FROM THE CUSTOMS TARIFF—CONTINUED.

Description of Articles.			Rate.	Tax.
			per cent.	
Infant's food	...	...	50	2\$000 kilogramme
Tea	...	...	50	3\$000 "
Tar	...	...	15	\$200 "
Camphor	...	...	25	1\$000 "
Brandy	} in casks	...	.....	1\$500 "
Whiskey		...	.....
Rum		...	.....
	in other vessels		.....	1\$300 "
Gin	...	...	.....	\$800
Opium	...	...	50	12\$000
Bitters, in barrels	...	...	.....	\$500
" other vessels	...	...	.....	\$300
Wines, champagne, etc.	...	...	.....	1\$600
Artificial essences	...	...	30	6\$000
Blacking, liquid	...	...	50	\$250
" paste, etc.	...	...	.....	\$800
Indigo, aniline	...	...	20	1\$200
Perfumes	...	...	60	4\$000
Ink	...	...	50	\$600
Varnishes	...	...	.....	\$500
Mineral waters, any kind	...	...	60	\$350
Acids	...	...	25	
Capsules, medicinal	...	...	25	20\$000
Carbonates	...	...	20 to 50	
Chlorate and muriates	...	...	50	
Citrates	...	...	40	
Extracts, medicinal	...	...	50	
Vitrates	...	...	50	
Oxydes	...	...	15 to 50	
Pepsine, paste	...	...	50	15\$000
" powder, etc.	...	...	.....	5\$000
Phosphates and sulphates	...	...	50	
Sulphurets and tartarates	...	...	25 to 50	

EXTRACTS FROM THE CUSTOMS TARIFF—CONTINUED.

Description of Articles.	Rate.	Tax.
	per cent.	
Wines, medicinal	50	3\$000
Timber	50	
Chests	50	[set
Billiards, ordinary and fine ...	50 to 60	200\$000, 500\$000 each
Chairs	60	
Beds and sofas	50 to 60	
Stockings, according to size ...	.....	3\$200 to 6\$800 doz.pair
Underclothing, shirts	80	8\$000 dozen
„ pants, etc.	60	
Shirts, starched ... ..	.....	8\$000 kilogramme
Cuffs „ ... ..	.....	5\$000 dozen pairs
Collars „ ... ..	.....	3\$600 dozen
Cotton piece goods	60	
Panama hats	60	6\$300 each
Straw „ ... ..	.....	1\$600 to 2\$600
Bed clothing, cotton, etc. ...	60	
Stockings, fine... ..	60	
Furniture, not specified ...	50 to 60	
Photographs and prints ...	50	
Ditto for educational works ...	15	
Printed matter	15	manuscripts free
Paper	50	
Silk and fine linen	60	
Asbestos, marble jasper ...	20	
Cement, emery ... ..	.....	coal free
Precious stones	2	ad valorem (gold free)
China and glass	50 to 60	
Gold jewellery... ..	15	ad valorem (silver free)
Silver „	15	
Copper, worked	50	
Lead, tin, and zinc	30 to 60	
„ „ in bars	15	
Iron and steel	30 to 60	

EXTRACTS FROM THE CUSTOMS TARIFF—CONTINUED.

Description of Articles.	Rate.	Tax.
	per cent.	
Aluminium and antimony ..	25	
Arsenic and Sulphur ...	20	
Mercury and phosphorous ...	20	
Nickel, potassium, sodium ...	25	
Other metalloides ...	25	ad valorem
Guns and rifles, steel barrel ...	50 to 60	12\$000
" bronze " ...	50 to 60	20\$000
Revolvers, powder ...	60	
Shot, lead ...	80	
Swords ...	50	
Penknives and razors, fine ...	50	7\$000 dozen
Scissors and table knives ...	50	
Watches, gold, each ...	20	10\$000 each
" repeaters, each ...	20	30\$000 "
Clocks ...	50	
Carriages ...	30 to 60	
Instruments, scientific ...	15	
" " some exceptions ...	50	
" musical ...	50	
Balances ...	50	
Mills, large, motor force ...	15	
" coffee, wheat, etc. ...	50	\$700 kilogramme
Machinery ...	15	
Type, printing ...	15	
Bicycles ...	25	50\$000 one
" child's ...	25	20\$000 "
Rubber goods ...	50	
Pipes and whips ...	50	
Umbrellas & sunshades, cotton		
or linen	.....	1\$500 one
" " woollen	.....	3\$000 "
" " silk	.....	7\$000 "
" " lace edged	.....	14\$000 "

EXTRACTS FROM THE CUSTOMS TARIFF—CONTINUED.

Description of Articles.	Rate.	Tax.
	per cent.	
Chocolate, fancy and plain ...	50	3\$000 kilogramme
Games and sealing wax ...	50	
Fans, masks, hooks ...	50	
Pneumatic tyres ...	5	ad valorem
Motor cars, commercial ...	5	"
" private ...	7	"
Sauces ...	50	
Paraffin ...	50	
Skates ...	50	3\$500 pair

It should be particularly noted that this tariff is in course of revision, and that there are other charges to be added to the foregoing table, such as two per cent. port works tax, Consular fees, stamps and other additions which in some cases bring total duties to over one hundred per cent. Tariffs again frequently include packing when by weight, and catalogues, etc., put in cases to fill up, are charged at the same rate as ordinary printed books. I also quote the warning of the "Times" correspondent in Brazil against sending goods not ordered, and against including stationery, invoice forms, etc., charged at a very high rate of duty.

It should be noted however that the future tariff will in all probability contain preferential clauses for reciprocal abatements.

APPENDIX C.

SOME INDUSTRIES IN BRAZIL.

Industry.	No. of Works.	Hands.	In Contos of Reis.	
			Capital.	Pro- duction.
Matches	18	3,969	17,060	21,275
Electrical Material	1	33	50	160
Rubber Goods	2	18	13	36
Iron	23	501	1,746	3,669
„ Wire	8	54	76 $\frac{1}{2}$	181
Marble	23	439	1,099 $\frac{1}{2}$	1,824
Lead and Zinc	8	321	1,941	1,881 $\frac{4}{10}$
Optical Goods	3	23	270	210
Brushes, &c.	21	250	671 $\frac{1}{2}$	1,583
Balances	1	16	400	600
Butter and Cheese	138	981	2,998 $\frac{7}{10}$	6,998 $\frac{740}{1000}$
Billiards	2	14	70	160
Jewellery	20	167	822	1,940
Biscuits	13	467	1,995	3,282
Mineral Waters and Spirits	145	1,655	6,630 $\frac{971}{1000}$	9,211 $\frac{653}{1000}$
Buttons	1	150	160	250
Breweries	186	2,942	27,555 $\frac{8}{10}$	22,686 $\frac{290}{1000}$
Quarries	21	699	1,826	3,309
Hats (Men's)	46	3,105	10,417	15,384 $\frac{2}{10}$
„ (Ladies')	37	163	1,398	1,727
Coal (Animal)	1	9	40	54
Boots and Shoes... ..	119	7,379	10,117	26,726 $\frac{9}{10}$
Lime and Cement	36	1,027	11,259 $\frac{1}{2}$	4,976 $\frac{340}{1000}$
Gas Mantles	2	11	31	60
Cocoa, &c.	15	484	2,435	3,680
Candles (Wax)	9	107	711	914
Blacking	4	17	35	106
Nails	6	165	820	1,185
Glue	3	14	40	81
Confectionery	40	1,203	1,988	4,208
Preserves... ..	14	506	1,530	2,211 $\frac{1}{2}$

SOME INDUSTRIES IN BRAZIL—CONTINUED.

Industry.	No. of Works.	Hands.	In Contos of Reis.	
			Capital.	Pro- duction.
Shipbuilding ...	17	3,622	2,215	5.785
Rope Making ...	7	586	2,514	2,382
Corsets ...	11	148	458	879
Ties ...	11	689	1,003	2,320
Tanned Hides ...	108	1,967	9,485	15,091 $\frac{1}{10}$
Caskets and Cases ...	2	9	11	40
Inks ...	8	98	465	968 $\frac{8}{10}$
Pins ...	2	35	188	161
Hair Pins, &c. ...	2	74	80	190
Meat Extract ...	1	200	6,000	700
Fireworks ...	1	3	20	16
Maize Meal ...	1	10	10	54
Cotton Mills ...	161	45,942	234,428 $\frac{4}{10}$	135,025 $\frac{668}{1000}$
Woollen „ ...	15	1,957	14,848	11,375 $\frac{2}{10}$
Linen „ ...	2	160	1,230	648
Silk „ ...	5	244	965	1,042 $\frac{320}{1000}$
Aramina „ ...	1	200	1,500	630
Artificial Flowers ...	32	432	694	1,337 $\frac{1}{2}$
Foundries ...	169	6,861	22,964	31,625 $\frac{240}{1000}$
Lasts (Boots) ...	3	46	75	220
Formicides ...	2	51	200	270
Gloves ...	9	89	288	468
Ice ...	5	81	550	1,734
Oils and Resins ...	20	532	3,390 $\frac{8}{10}$	4,493 $\frac{646}{1000}$
Images ...	2	9	14	40
Hams ...	6	37	238	403
Musical Instruments ...	19	151	249 $\frac{6}{10}$	402 $\frac{3}{10}$
Underclothing... ..	31	2,218	3,151	6,298 $\frac{1}{2}$
Machinery ...	12	268	1,055	984
Trunks and Valises ...	27	250	1,248	2,864
Matte ...	44	4,975	14,250	22,573
Transport Material ...	31	1,718	8,429 $\frac{6}{10}$	11,013 $\frac{884}{1000}$
Furniture ...	85	2,843	6,033	11,760

SOME INDUSTRIES IN BRAZIL—CONTINUED.

Industry.	No. of Works.	Hands.	In Contos of Reis.	
			Capital.	Pro- duction.
Flour Mills	100	1,499	16,416 ³ ₁₀	39,359 ¹ ₂
Cardboard, etc.	17	606	5,083	3,987
Wall Papers	6	228	1,596	1,620
Umbrellas, etc.	24	195	3,221	3,729
Perfumery	17	382	1,460	2,081 ⁷⁵ ₁₀₀
Helmets	1	12	6	15
Lace, etc.	1	28	45	96
Pastry	87	683	2,602 ²⁹ ₁₀₀	3,897 ⁴⁵ ₁₀₀₀
Preserved Tomatos	4	100	515	570
Horn Combs	3	93	210	484
Photography	15	116	1,093	2,099
Pianos	1	4	40	30
China and Pottery	179	2,553	10,547 ³⁰⁵ ₁₀₀₀	10,363
Chemicals	60	1,153	6,502	10,212
Sugar Refineries	22	454	10,437 ⁷⁸⁶ ₁₀₀₀	15,413 ⁷⁶⁰ ₁₀₀₀
Wooden Shoes	18	134	273	679 ¹ ₁₀
Lard	34	587	4,350	13,485
Soap & Tallow Candles	91	1,763	15,145 ⁶ ₁₀	22,039 ⁷¹⁵ ₁₀₀₀
Saw Mills	197	3,766	14,488	31,379
Salt	53	2,146	9,461	3,126 ³⁶⁸ ₁₀₀₀
Harness and Saddlery	40	1,309	2,517	4,448
Syrups and Liqueurs ...	8	35	250	475
Bellows	1	6	15	28
Sugar Mills	199	13,136	74,061 ⁵⁸⁰ ₁₀₀₀	67,257 ³⁶³ ₁₀₀₀
Tobacco Manufactories	104	7,407	12,950 ⁹¹⁰ ₁₀₀₀	20,318 ⁷⁸⁵ ₁₀₀₀
Cooperages	4	14	20	72
Lamps	1	12	6	32
Varnishes	1	42	200	60
Glass	7	1,328	2,975	3,638
Wine	104	1,316	2,877 ¹ ₂	4,870 ³⁴⁰ ₁₀₀₀
Vinegar	5	19	79	114
Pemmican	26	3,782	6,277	38,769 ³ ₁₀
Total	3258	151,841	665,976 ⁶⁶⁸ ₁₀₀₀	741,536 ¹⁰⁸ ₁₀₀₀

APPENDIX D.

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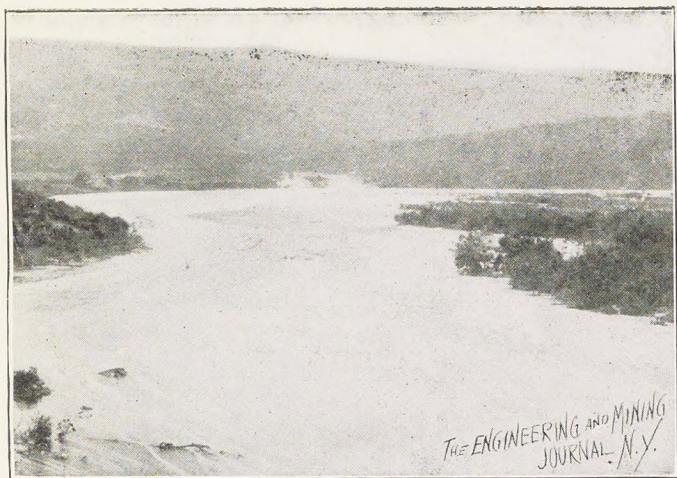
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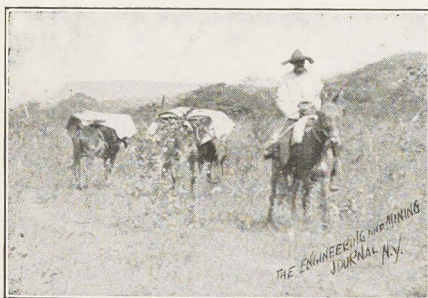
JUNCTION OF ANDARAHY AND PARAGUASSÚ RIVERS.
 Flood time; three kilometres south-east of Andarahy.
 The formation in the background.



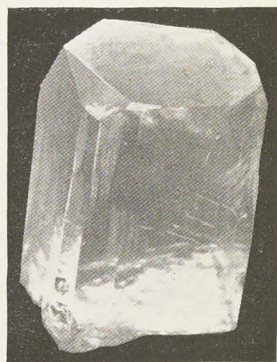
PINK QUARTZITE LEDGES, NEAR LENÇÕES
 (Diamond bearing).



SURFACE LIMESONTE, ANGICO, BAHIA.



PACK MULES
On the way to the diamond fields,
Bahia.



NATURAL CRYSTAL OF
WHITE TOPAZ.

By the courtesy of Leopold Claremont, Esq.,
author of "The Gem Cutters' Craft,

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APPENDIX E.

GLOSSARY OF TERMS RELATING MOSTLY TO MINERALOGY.

- Aguas Mineraes, mineral waters.
- Agata, agate.
- Amianto, asbestos.
- Arenoso, sandy.
- Ardosias, clay deposits.
- Areia, sand.
- Argillas, clays.
- Azulinhos, small sapphires.
- Batea, bowl for washing gravel.
- Cal, lime
- Calcareos, limestone rocks.
- Carvão de Pedra, coal.
- Camada, layer.
- Canga, brecciated calcareous deposit with hematite and gold.
- Carbonados, spherical diamonds of a greyish black colour.
- Carimbé, wooden bowl, in which gravel is carried on the head.
- Cascalho, conglomerate (diamond bearing).
- Cata, open working; a sort of pit.
- Captivos de Cobre, rutile, pseudomorph of anatase, rolled pebbles, etc.
- Chapada, here applied to the Bahia table land.
- Cinnabrio, cinnabar.
- Cobre, copper.

Chumbo, lead.

Enxofre, sulphur.

Estanho, tin.

Esmeril, emery.

Estrada, road.

Falha, fault.

Feijoes, rolled (water worn) tourmalines (black).

Favas, various rolled fragments of rare earths.

Ferro, iron.

Fenda, crack.

Formação, association of minerals; in which diamonds are found.

Giz, chalk.

Granadas, garnets.

Itabirites, hematites.

Itacolumite, flexible white quartzose sandstone.

Jacotinga, multi coloured iron ore (gold bearing).

Lage, flat sand bank.

Lavrito, board.

Lavra, diamond washing.

Leito, bed.

Marmore, marble.

Morro, mount.

Nivel, level.

Ouro, gold.

Oligisto, hematite.

Pedra, stone.

Pomes, pumice.

Pedra hume, alum.

Pedra sabão, soap stone.

- Pico, peak.
Planalto, table land.
Poço, well or spring.
Poeira, dust.
Polvora, powder.
Platina, platinum.
Praia, beach.
Rochas, rocks.
Sal, salt.
Salitre, saltpetre.
Signaes, signals.
Terra roxa, red earth (Devonian type).
Tungstato de Cal, scheelite.
Turfa, peat.
Varzea, Savannah, plains subject to inundation.
Veeiros, veins.

APPENDIX F.

GUIDE TO THE IMMIGRANT IN BRAZIL.

Reception and Lodging of Immigrants in the Port of Rio de Janeiro.

Steamers from foreign ports, anchoring in the port of Rio, are visited by uniformed interpreters, who speak most of the principal European languages, and offer, in the name of the Brazilian Government, to all healthy persons of good character free disembarkation and provisional board and lodging in the home in the Ilha das Flores.

This island is situated in the bay, some fifty minutes' distance from the city.

The immigrants are conducted thither, and after declaring their names, ages, nationalities, professions, and place of origin and destiny, if any, are permitted to remain from three to eight days. The immigrants may go in parties to the city to perform any necessary business, and will, if required, be accompanied by interpreters.

In the city will be found a bureau of immigration where every information will be furnished, as well as free passages to any part of the Republic in the case of agriculturists recently arrived.

Aid to Agriculturists with families.

The above will be given transport to the lot selected, together with their families and all their belongings.

The lots vary in price from 200 milreis to 750 milreis for 25 hectares, without a house, and may be paid for in instalments extending over seven or ten years, without interest. Houses vary in cost from 500\$000 to 2,000\$000.

The colonist will be given some tools, and in the case of being without means, can obtain work in road construction, etc., for the first six months. The immigrant arriving without his family, must pay cash for any lot. Owing to the vast increase in the number of immigrants, it is advisable for those who intend to go out to choose their domicile after arrival, in consultation with the authorities in Rio de Janeiro.

COMMISSION OF ECONOMIC EXPANSION OF
BRAZIL.

Direction : 28, BOULEVARD DES ITALIENS, PARIS.

Director : Dr. L. R. VIEIRA SOUTO.

Delegation in Switzerland : 4, Rue de la Croix d'Or, Geneva.

Delegate : Dr. Abdon Felinto Milanez.

Delegation in Austria : 13, Spiegelgasse, Vienna.

Delegate : Dr. José Bonifacio da Cunha.

Delegation in Belgium and Holland : 48A, Boulevard
Botanique, Brussels.

Delegate : Delfim Carlos B. da Silva.

Agency in Germany : 1, Tauenzienstrasse, Berlin, W. 50.

Agent (1st class) : Dr. Hans Heilborn.

Agency in Italy : Via NATIONALE 114, Rome.

Agent (1st class) : Francisco Canella.

Agency in Egypt : Brazilian Consulate, Rue BAB-EL-HADID,
Cairo.

Agent (1st class) : Guilherme Chaves Moutier.

Agency in London : Brazilian Consulate, South Place, E.C.

Agent (2nd class) : Hippolyto Hermes de Vasconcellos.

Agency in Spain : Paseo Colon 29, entre suelo, Barcelona.

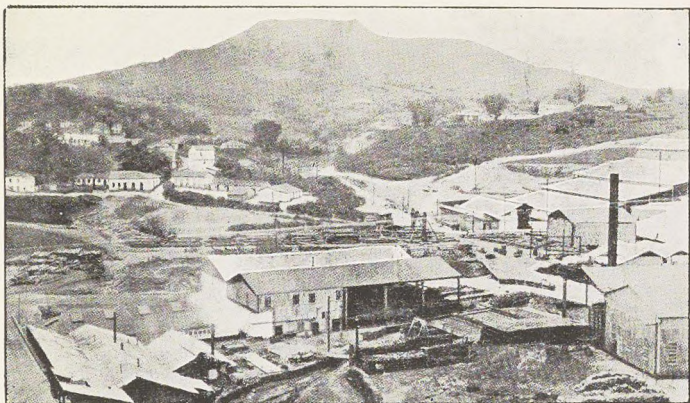
Agent (3rd class) : Sy nphronio Magalhaes.

Bureau in Plymouth : 21, Clifford Terrace, St. Budeaux,
Devonport.

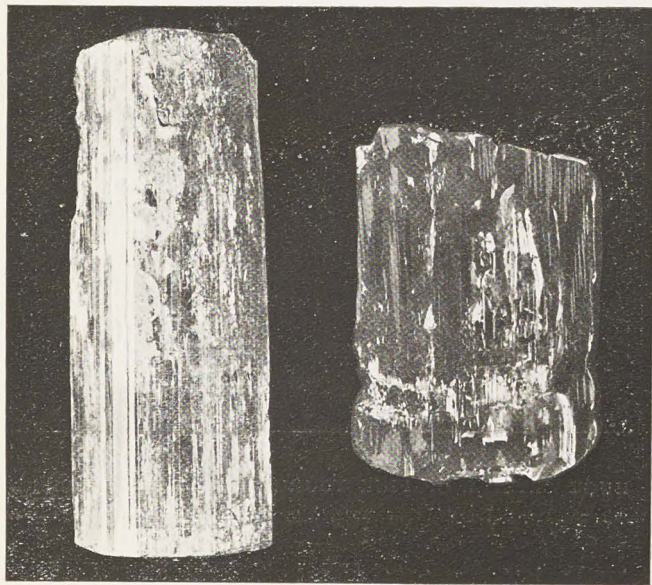
Under the direction of J. C. Oakenfull.

The São Paulo Government has an office at 99, Place de
Meir, Antwerp.

The Commissioner is Dr. Fereira Ramos. The Secretary,
Dr. Ruy da Trindade.

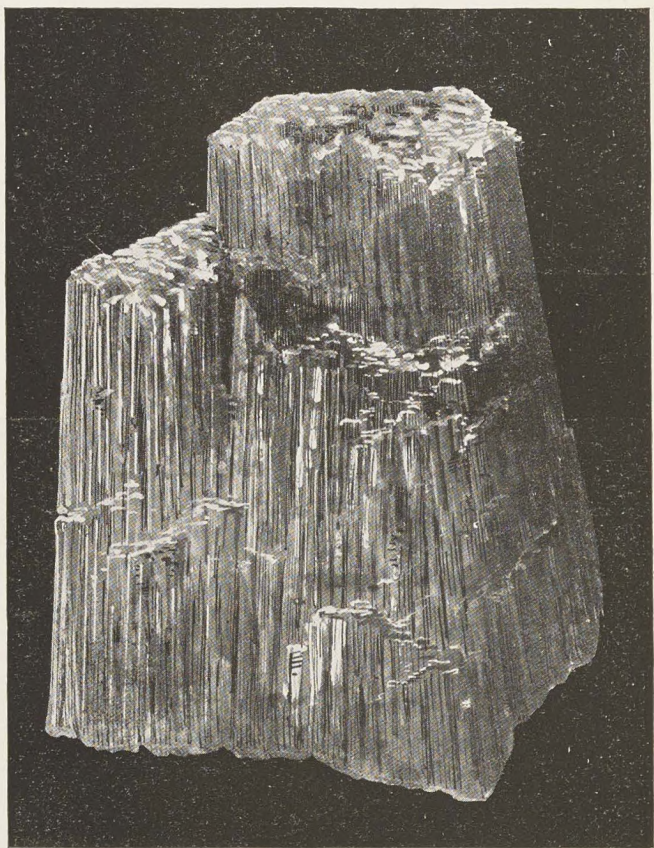


MORRO VELHO GOLD MINE.
São João d'el Rey, Sabara, Minas Geraes.



CRYSTALS OF BERYL.

By kind permission of Leopold Claremont, Esq, author of "The Gem Cutters' Craft."



HUGE CRYSTAL OF PINK TOURMALINE (NATURAL SIZE).
By the courtesy of Leopold Claremont, Esq., author of "The Gem Cutters' Craft."







